NOAA CFABA-24(7)

A UNITED STATES DEPARTMENT OF COMMERCE PUBLICATION

Commercial Fisheries Abstracts

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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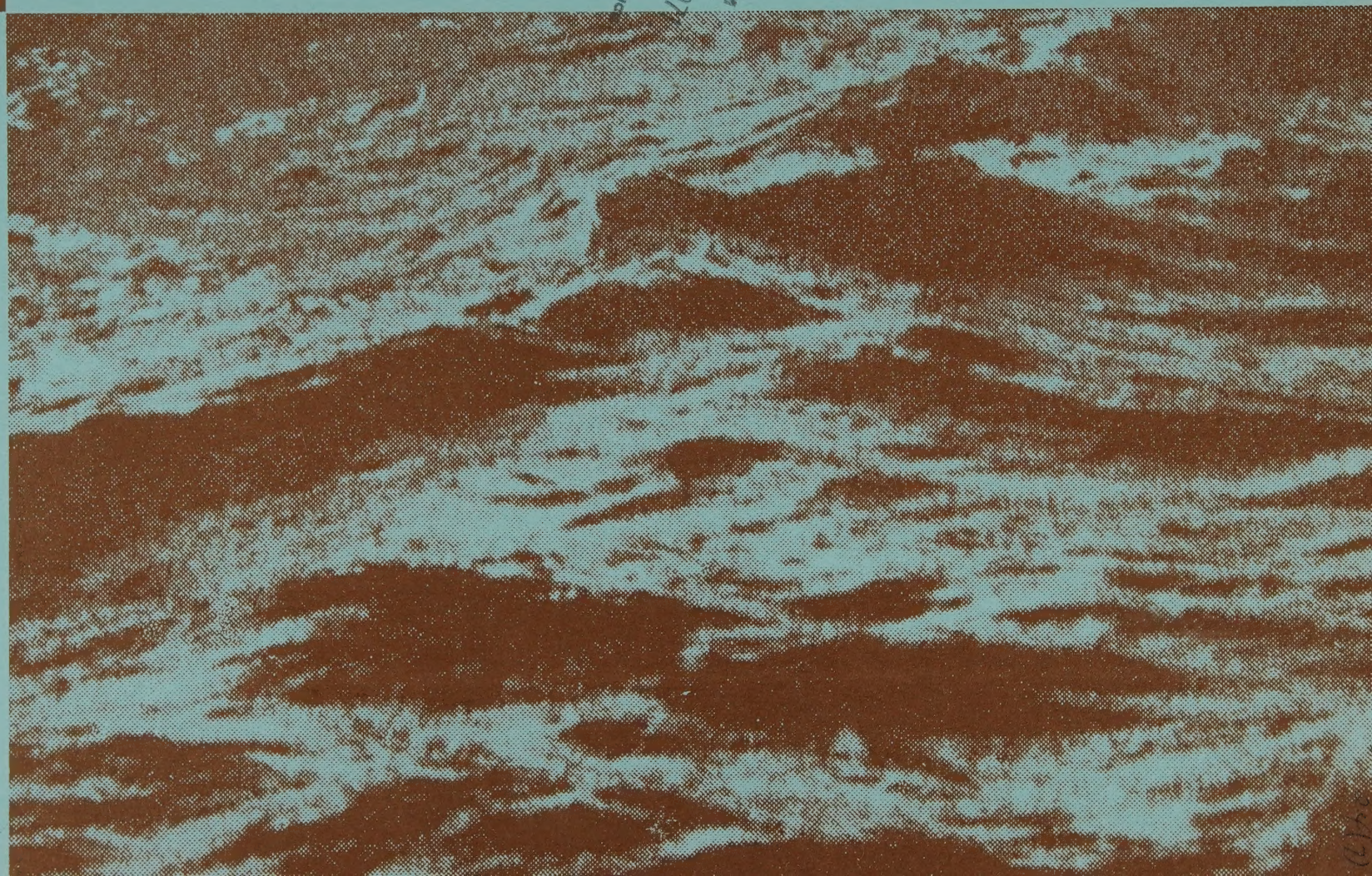

JULY 1971

VOLUME 24
NUMBER 7

Seattle, Wash.

UNITED STATES DEPARTMENT OF COMMERCE
Maurice H. Stans, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Dr. Robert M. White, *Administrator*

NATIONAL MARINE FISHERIES SERVICE
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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.2 IS BALL LIGHTNING CAUSED BY ANTIMATTER METEORITES?

Ashby, D. E. T. F. (UKAEA Culham Laboratory, Abingdon, Berkshire, England), and C. Whitehead (UKAEA Atomic Research Establishment, Harwell, Berkshire)
Nature 230, No. 5290, 180-182 (March 19, 1971)

In late 1970, Altschuler et al. suggested that, since the concentration of short-lived radioactive isotopes produced by lightning may be responsible for ball lightning, radiation measurements should be made near tornadoes and thunderstorms (Nature 228, No. 5271, 545-547, November 7, 1970). For the past year, the authors of the present article have been making just such measurements. Their purpose, however, was to test the hypothesis that ball lightning is caused by the annihilation of minute fragments of meteoritic antimatter from the upper atmosphere. This hypothesis attempts to explain some of the peculiar characteristics of ball lightning--for example, its ability to enter buildings and aircraft and its estimated energy, from 10^5 to 10^6 J. (The energy liberated by annihilation of a speck of antimatter having a radius of 5 μm. and weighing 5×10^{-10} gram would be 10^5 J; the ionization produced would probably have the optical characteristics ball lightning is assumed to have.) The theory premises that antimatter can be relatively stable in the presence of ordinary matter. The rationale of this premise is the possibility that a barrier exists between ordinary matter and antimatter in the solid state. Hence a small particle of antimatter could be comparatively stable if its velocity relative to the surrounding air were low enough to prevent impacting air molecules from overcoming the potential barrier.

The authors present a simple argument suggesting how thunderstorms might concentrate antimatter dust particles, and they give the results of their observations

(over)

0.31 (9.19) DETERMINATION OF HYDROCARBONS IN SEAWATER EXTRACTS OF CRUDE OIL AND CRUDE OIL FRACTIONS

Boylan, D. B., and B. W. Tripp (Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543)
Nature 230, No. 5288, 44-47 (March 5, 1971)

Since rapid identification of oil can but prove useful in the enforcement of oil-pollution regulations, the authors are attempting to collect data on the solubility of oil and oil products in water systems. Here they report the isolation, identification, and quantitative determination of the major components in the seawater extracts of several crude oils and a kerosene. In each they noted significant differences in the relative amounts of naphthalene compounds, especially in the relative isomer content--that is, the 1 and 2-methyl naphthalenes and the 1:2, 1:6, 2:6-dimethyl naphthalenes. On the assumption that naphthalene and other naphthalene-type compounds are the components most toxic to fish, they suggest that analysis of sea-water extracts should give information useful in establishing a toxicity index of oil pollutants. Because the boiling envelope in the aqueous extract of Kuwait oil was quite high (due mostly to polar aromatic material), and because concentration and retention of such water-soluble materials by marine animals could be a health hazard, the authors' future investigations will concern identification of water-soluble components in the high-boiling region.
[4 figures, 3 tables, 11 references] LB

0.2 (2.146)(2.12) ON THE METHOD OF INFERENCE OF STANDING CROP AND GREGARIOUS STATE OF NEKTON IN A FISHING GROUND BY THE SIMULTANEOUS USE OF TWO ECHO-SOUNDERS OF DIFFERENT DIRECTIVITIES

Kawakami, Tasae (Dept. of Fisheries, Kyoto University, Maizuru, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1203-1207 (December 1970)

If a fishing ground is simultaneously scanned with two types of echo-sounders having different directivities, one wide and one narrow, different echograms of any fish shoals that may be present will result. From these different echo patterns, the density and the abundance of the shoals can be determined. Using such variables as the area of the fishing ground; the number of fish shoals on the ground; the length, circumference, and area of the shoals; the directivity and angle of the scanner; and the horizontal distance from the margin of the shoal to the limit of the sounder, the author develops equations to represent the appearance of the echo patterns given by variously distributed fish. Then he tabulates the results of simulation trials in which the fish shoals are long but have no width and in which the fish are distributed individually rather than in shoals.
[3 figures, 4 tables] LB

0.35 SYNAPTIC FACILITATION: LONG-TERM NEUROMUSCULAR FACILITATION IN CRUSTACEANS

Sherman, R. G., and H. L. Atwood (Department of Zoology, University of Toronto, Toronto, Ontario, Canada)
Science 171, No. 3977, 1248-1250 (March 26, 1971)

Recently the authors found that certain crustacean neuromuscular synapses exhibit not only the usual "short-term" facilitation, but also a "long-term" facilitation that takes longer to develop and that persists for a considerable period of time after impulse activity has ceased. [Facilitation is the term applied to the enhancement or reinforcement of a reflex or other nervous activity by the arrival at the reflex center of impulses that originate elsewhere.] The authors found that continuous stimulation at frequencies of 5 hertz or greater for 20 to 30 minutes results in a two-to fivefold increase in the amplitudes of excitatory postsynaptic potential recorded from the stretcher and opener muscles of decapod crustaceans (crayfish and Bermuda crabs). The long-term facilitation appeared to result from an accumulation of sodium ions within the nerve terminals, and it persisted for at least 1 hour after stimulation had stopped. These observations, apparently, have implications in such central processes as memory formation and learning.
[1 figure, 20 references] FTP

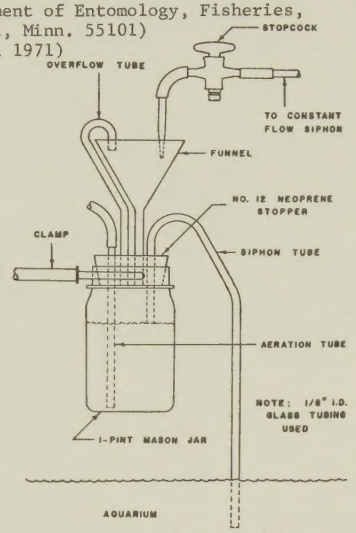
0.119 AN AUTOMATIC BRINE SHRIMP FEEDER

Anderson, Emory D., and Lloyd L. Smith, Jr. (Department of Entomology, Fisheries, and Wildlife, University of Minnesota, St. Paul, Minn. 55101)
Progressive Fish Culturist 33, No. 2, 118-119 (April 1971)

The growth of larvae of the lake herring (Coregonus artedii) was studied at the University of Minnesota laboratories during the period March-June 1968 as part of an investigation of the factors which were affecting the abundance of this fish in western Lake Superior (In press: "Factors Affecting Abundance of Lake Herring, Coregonus artedii LeSuer, in Western Lake Superior" by Anderson and Smith). This study was supported by Public Law 88-309 Project No. 4-8-R of the Minnesota Department of Conservation.

The necessity for continuous feeding of live food to the herring prompted the design of an automatic feeder (see drawing) which would deliver live brine shrimp (Artemia spp.) to the larvae at regular and frequent intervals during extended periods.

Use of the feeder is extremely flexible: the jar size, cycle frequency, and volume delivered can be varied to meet demands. Food organisms need not be limited to brine shrimp but can include almost any small prey items suitable for a particular use. [1 figure]



Reprinted in part

0.2

of four unusual radiation events. Using a 20 cc. Ge(Li) detector and a 900 cc. NaI(Tl) detector, they observed short intense bursts of radiation of the sort that might be expected in the wake of antimatter annihilation in the vicinity of thunderstorms. Four channels (511±50 Kev. and 662±50 Kev. in the Ge(Li) detector and 511±75 Kev. and all energies above this channel in the NaI detector) were monitored continuously; the counting rates were (respectively) about 0.5, 0.2, 30 and 70 c.p.s. In both detectors, the counting rate in the 511 Kev. region increased by factors of from 10 to 50 for periods of a few seconds. These rates are equivalent to those produced by a 1 mc. source of 511 Kev. radiation in the immediate vicinity of the detectors; they correspond to those that might be produced by the annihilation of between 10^{-11} and 6×10^{-11} g. of antimatter at a distance of 500 m. In one event, the peak of the pulse spectrum was apparently due to annihilation radiation.

The authors' findings do not substantiate the ball lightning theory of Altschuler et al. The fact that 511 Kev. radiation lasts for only a few seconds does not coincide with the half life of ^{15}O (123 sec.) and ^{17}F (66 sec.), both of which Altschuler et al. tentatively associate with ball lightning. Nor do the findings prove the existence of antimatter dust particles or of the particles' association with ball lightning. The radiation events, however, are consistent with the proposition that micron-sized particles of antimatter exist. Although the duration of the observed radiation events is similar to that of ball lightning, their correlation with thunderstorms is as yet obscure.
[2 figures, 23 references] LB

0.35 TASTE STIMULI: QUALITY CODING TIME

Halpern, Bruce C., and Daniel N. Tapper (Departments of Psychology and Physical Biology and Section of Neurobiology and Behavior, Cornell University, Ithaca, N.Y. 14850)
Science 171, No. 3977, 1256-1258 (March 26, 1971)

Rats were exposed to a restricted fluid consumption schedule combined with a radiation-induced gustatory avoidance procedure, in order to determine how long it takes them to recognize and stop drinking the specific chemical solutions that they were conditioned to avoid. Subsequently, they were tested for temporal characteristics of generalization to other chemical solutions. The rats were conditioned to avoid drinking 300 millimolar NaCl solution. They recognized and rejected this solution within 250 to 600 milliseconds of onset of stimulus (a period containing the phasic portion of the peripheral neural response). The rats generalized to 500 millimolar NaCl solution but not to 500 millimolar solution of sucrose. The rejection was based on quality identification that was neurally encoded during the brief period.
[2 figures, 23 references] FTP

0.37 VALIDATION OF DEXTRAN BLUE FOR ESTIMATING INTESTINAL WATER VOLUME IN FISH

Shehadeh, Ziad H., and Gary L. Peterson (Oceanic Inst., Waimanalo, Hawaii)
Chemical Abstracts 73, No. 23, 116986n (December 7, 1970)

0.2 FOOD CHAIN MODEL FOR DDT KINETICS IN A FRESHWATER MARSH
(9.19)

Eberhardt, L. L. (Department of Ecosystems, Battelle Memorial Institute, Pacific Northwest Laboratories, Richland, Wash.), R. L. Meeks (Winous Point Shooting Club, Port Clinton, Ohio), and T. J. Peterle (Department of Zoology, Ohio State University, Columbus, Ohio)
Nature 230, No. 5288, 60-62 (March 5, 1971)

The authors discuss some of the problems that must be solved before a model for the kinetics of pesticides in ecosystems can be completed, and they describe some of the progress they have made in developing a food-chain model for DDT (including its various degradation and metabolic products, especially in the fauna) kinetics in a Lake Erie marsh.
[1 figure, 1 table, 17 references] LB

0.35 SEROTONIN: TWO DIFFERENT INHIBITORY ACTIONS ON SNAIL NEURONS

Gerschenfeld, H. M. (Laboratoire de Neurophysiologie, Cellulaire, 4, Avenue Gordon-Bennett, 75 Paris 16e, France)
Science 171, No. 3977, 1252-1254 (March 26, 1971)

Serotonin (5-hydroxytryptamine) inhibits snail neurons through two different mechanisms: on some neurons it increases selectively the permeability of the membrane to chloride ions giving rise to a net influx of this ion; on other neurons it increases the permeability of the membrane to potassium ions giving rise to a net potassium outflux. The serotonin receptors involved in these two inhibitions are different.
[1 figure, 2 tables, 29 references] FTP

0.36 (1.70) LACTATE ACIDOSIS AS A CAUSE OF MORTALITY IN CAPTURED SHARKS: AN HYPOTHESIS

Caillouet, Charles W., Jr. (Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Rickenbacker Causeway, Miami, Fla. 33149)
Transactions of the American Fisheries Society 100, No. 1, 139-140 (January 1971)

Mortality or asphyxia in bony fishes following strenuous activity is related to the accumulation of lactate in the fishes' tissues. Several authors have suggested that the mortality is due to lactate acidosis--that is, an increase in tissue acidity attributable almost entirely to lactic acid. Since human beings suffering from lactate acidosis are successfully treated with injections of such buffers as sodium lactate and sodium bicarbonate, and since experimental mammals have been successfully treated for the condition with the redox dye methylene blue, the author suggests that valuable experimental and exhibition animals could also be treated successfully (rather than "walked," a treatment that would presumably lead to increased oxidation of lactate). The lactate acidosis therapy for sharks might consist of injection of sodium lactate, sodium bicarbonate, or methylene blue.
[15 references]

LB

0.39 (0.4)(4.92) EFFECTS OF α-TOCOPHEROL DEFICIENCY ON CARP-- II. PROTEIN COMPOSITION OF THE DYSTROPHIC MUSCLE

Watanabe, Takeshi (Laboratory of Fisheries Biochemistry, Tokyo University of Fisheries, Konan 4, Minato-ku, Tokyo, Japan), Fumio Takashima (Department of Fisheries, Faculty of Agriculture, The University of Tokyo, Bunkyo-ku, Tokyo), Chinkichi Ogino, and Takashi Hibiya
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1231-1234 (December 1970)

Muscular dystrophy is one of the most striking features of carp fed either oxidized saury oil or a diet deficient in α-tocopherol. Although the dystrophic muscles contain a high concentration of moisture and a low concentration of protein, a considerable amount of the water is separate from the muscle. The indication, then, is that the lack of α-tocopherol induces some essential alteration in the protein composition of the muscle. Accordingly, the authors fractionated the proteins of dystrophic and normal muscles of carp into sarcoplasmic, myofibrillar, residual intracellular, and stroma proteins. The muscles of fish kept on an α-tocopherol-free diet for 90 days had far lower concentrations of both total and myofibrillar proteins and a considerably higher concentration of stroma protein than those of the control fish. A marked loss of myosin and actomyosin characterized the myofibrillar protein fraction from the dystrophic muscle.
[2 figures, 2 tables, 15 references]

LB

0.4 (2.9)(9.19) (9.6) MOLECULAR TOXICOLOGY

Williams, R. T. (reviewer)
A Symposium on Mechanisms of Toxicity, xiii + 257 pp.
W. N. Aldridge (editor)
Biological Council: The Coordinating Committee for Symposia on Drug Action; published by Macmillan, London and Basingstoke (February 1971). £5.50
Nature 230, No. 5292, 313-314 (April 2, 1971)

The answer to why a compound is toxic depends on whether one thinks in terms of the whole animal, a tissue, a cell, or a molecule. This book explores the answer in terms of the molecule. It contains 16 papers grouped into 4 sections. Successively, the sections deal with the effects of poisons on enzymes, their effects on proteins, the causes of cell injury, and the problems of lethal synthesis. The reviewer considers these papers interesting not only because they illustrate mechanisms of toxicity at the molecular level (academically the most satisfying and useful level to consider the basis of toxicity) but because the hypotheses they propose and the questions they raise give useful leads for future research that could provide rational explanations of the responses of man and animals to the toxic effects of drugs and other chemicals.

LB

0.5 (0.4)(9.19) BIOCHEMICAL MODEL FOR THE BIOLOGICAL METHYLATION OF MERCURY SUGGESTED FROM METHYLATION STUDIES IN VIVO WITH NEUROSPORA CRASSA

Landner, Lars (Swedish Water and Air Pollution Research Laboratory, Drottning Kristinas väg 47 D, S-114 28 Stockholm, Sweden)
Nature 230, No. 5294, 452-454 (April 16, 1971)

Considerable speculation exists concerning the mechanism of synthesis of methyl mercury in lake sediments contaminated with inorganic or phenyl mercury. J. M. Wood, S. F. Kennedy, and C. G. Rosén [Nature 220, 173 (1968)] demonstrated one process involving methyl-cobalamin (a B_{12}-derivative) in cell-free extracts of methanogenic bacteria. But, vitamin B_{12} is not known to be involved in the metabolism of Neurospora, so the author studied the biosynthesis of methyl mercury in this organism, where the pathway should be different. He studied, specifically, the relationship between the apparent resistance of Neurospora to inorganic mercury and its ability to produce methyl mercury. Highly tolerant Neurospora isolates as well as nonselected strains were cultivated in Erlenmeyer flasks containing liquid Fries minimal medium [N. Fries, Symbolae Bot. Upsaliensis 3, 188 (1938)] with Hg^{2+} and a thiol added at different concentrations. Five different thiols were tested (DL-homocysteine, L-cysteine, mercaptoacetic acid, dimercaptopropanol, and glutathione).

The author concluded: (1) The detoxicating methylation of mercury involves one or more steps of the methionine biosynthesis pathway; (2) because, out of the five different thiols tested only cysteine and homocysteine increase the amount of methyl mercury per weight of cell, thiols apparently do not stimulate methylation of mercury only by facilitating the uptake of Hg^{2+} to the cells; (3) a

(over)

0.5 MICROBIAL TOXIN FORMATION AND ACTIVITY

Glezerov, V. Z., E. V. Perova, T. I. Bulatova, and L. S. Lukina Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) 47, No. 9, 43-51 (1970) Available from the National Technical Information Services, Operations Division, Springfield, Va. 22151. Order No. JPRS-51961, PC$3.00, microfiche 95¢.

U.S. Government Research and Development Reports 71, No. 4, 43 (February 25, 1971)

Contents: The effect of microbial toxins on permeability of the hematotissular barrier; Toxin production by Cl. botulinum, type F, on nonmeat nutrient media. Abstract reprinted

0.5 (0.4)(9.19)

negative control of the methylating enzyme--for example, a transmethylase--is affected presumably by methionine. (This conclusion was based on the relationship between yield of methyl mercury and concentration of homocysteine and homoserine in the medium. When a large surplus amount of DL-homoserine was added with approximately equimolar amounts of DL-homocysteine and Hg^{2+}, the yield of methyl mercury was doubled. No such increase occurred when DL-homocysteine was present in a large surplus amount over Hg^{2+}, or when DL-homocysteine was replaced by L-cysteine.) The author suggests that methionine can probably be formed in sufficient amounts only when a large surplus of homocysteine (over Hg^{2+}) is available. On the basis of these conclusions, the author proposes a tentative model for one type of biological methylation of mercury.
[3 tables, 14 references]

0.4 HISTOPATHOLOGICAL STUDIES OF THE LIVER AND KIDNEY OF MICE
(9.19) INJECTED WITH LETHAL DOSES OF PESTICIDES

Ishida, K., and T. Shirakawa (Department of Animal Management, Division of Animal Husbandry, School of Agriculture, Niigata University, Japan)
International Chemical Engineering 11, No. 1, 107-127 (January 1971)

Twelve kinds of agricultural chemicals were studied for their toxicity with respect to, and specificity of pathological changes induced in the liver and kidney of, the mouse. The chemicals had the following median lethal doses (LD_{50}): bordeaux, 21.9 mg./kg.; lead arsenate, 49.4; DDT, 81.9; BHC, 16.0; endrin, 1.8; dieldrin, 13.6; aldrin, 22.1; Tedion, 74.7; Knockmate, 69.1; parathion, 2.0; EM, 4.4; and nicotine sulfate, 2.0. Details of the histopathological changes in the liver and kidney of the mice are described.
[24 figures, 4 tables, 76 references] FTP

0.5 ISOLATION AND IDENTIFICATION OF A MICROBIAL INHIBITOR
(1.53) FROM PACIFIC HAKE (MERLUCCIUS PRODUCTUS)

Mendenhall, Von T. (Oregon State Univ., Corvallis, Oreg.)
Chemical Abstracts 74, No. 9, 39749d (March 1, 1971)

0.5 EGTVED VIRUS. I. STABILITY, GROWTH, AND STRUCTURE
(1.37)(9.15) OF THE DANISH STRAIN F1

De Kinkelin, P., and R. Scherrer (Stn. Virol. Immunol., Inst. Natl. Rech. Agron., Thiverval-Grignon, France)
Chemical Abstracts 74, No. 6, 39710j (March 1, 1971)

0.4 A DISEASE CURE IN DOGFISH GLANDS
(0.39)(1.71)

Anonymous
Fishing News International 10, No. 1, 11 (January 1971)

Iain McIntyre, professor of endocrine chemistry at the Royal Post Graduate School of Medicine at Hammersmith, London, suggests that the ultimobranchial gland of dogfish could play a vital role in the cure of certain bone diseases. This gland is very rich in calcitonin, a hormone that has proved highly effective in the treatment of Paget's disease (osteitis deformans); it may be equally effective in the treatment of osteopetrosis. According to the professor, calcitonin from the dogfish is more potent than that from any other fish, and is even more potent than the human hormone. The method of removing dogfish heads for market makes recovery of the gland a simple matter of snipping off the exposed organ. LB

0.35 ELECTRON SPIN RESONANCE STUDIES OF THE SOLUBILIZATION OF NITROXIDE SPIN PROBES BY MICELLAR SOLUTIONS

Oakes, J. (Unilever Research Port Sunlight Laboratory, Port Sunlight, Wirral, Cheshire, England)
Nature 231, No. 5297, 38-39 (May 7, 1971)

The author emphasizes that care must be taken in the interpretation of ESR spectra of spin probes in micellar and related systems as the recorded spectrum consists of a superposition of two individual spectra, above the surfactant critical micelle concentration, weighted according to the respective concentrations in aqueous and micellar states.
[1 figure, 9 references] FTP

0.36 BIOSYNTHESIS OF ALKYLDIACYLGLYCEROLS AND TRIACYLGLYCEROLS
(0.35) IN A CELL-FREE SYSTEM FROM THE LIVER OF DOGFISH
(SQUALUS ACANTHIAS)

Malins, Donald C. (present address: Pioneer Research Laboratory, National Marine Fisheries Service, NOAA, Seattle, Wash. 98102), and John R. Sargent (NERC Fisheries Biochemical Research Unit, University of Aberdeen, Aberdeen, AB1 3RA, Scotland, U.K.)
Biochemistry 10, No. 7, 1107-1110 (March 30, 1971)

This article presents evidence that in a cell-free preparation from the liver of normal dogfish, the biosynthesis of ester linkages greatly exceeds that of ether linkages. Also, fatty alcohol alone serves as a precursor of the small amounts of O-alkyl bonds formed. Furthermore, the enzymes controlling the equilibrium fatty acid ⇌ fatty alcohol may regulate the synthesis of alkyldiacylglycerols and triacylglycerols.
[1 figure, 2 tables, 16 references] FTP

0.39 BODY WEIGHT AND THE ENERGETICS OF TEMPERATURE REGULATION
(1.95)(9.13)

McNab, Brian K. (Department of Zoology, University of Florida, Gainsville, Fla. 32601)
Journal of Experimental Biology 53, No. 2, 329-348 (October 1970) (Cambridge University Press, 32 East 57th Street, New York, N.Y. 10022)

The author examines the influence of weight on the energetics of homoiotherms, giving special attention to the applicability of Newton's law of cooling. Among the mammals considered are the walrus, the northern elephant seal, and whales.
[9 figures, 3 tables, 59 references] LB

0.8 SOUNDS SUBMERGED
(2.146)(2.12)
(9.6)

Creasey, D. J. (reviewer)
Underwater Acoustics, xi + 308 pp.
Leon Camp
Published by Wiley-Interscience, New York and London (November 1970). £8.25
Nature 230, No. 5288, 66 (March 5, 1971)

The first chapters of this book deal with the mechanics of vibration and the ideas of complex number notation, phase, resonance, and selectivity. The following ones describe in detail wave and ray acoustics and various types of transducers and array radiation patterns. The final two chapters contain analyses of simple sonar systems and descriptions of the use of matched filter and signal processing techniques.
LB

0.12 CBP'S PROTEIN-FREE STERILE, SELF-LEVELING FLOORING SCREED

Anonymous
Fd Trade Rev. 41, No. 1, 43 (1971)
BFMIRA Abstracts 24, No. 4, Abstract No. 1135, 245 (April 1971)

It is claimed that a new resin reinforced screed which can be applied to any surface which requires levelling will not support bacteria or the growth of micro-organisms in any form. D.B.

Reprinted

2.1122 ANCHOR SEINING WITH TWIN DRUM-WINCHES

Burgess, John
Fishing News No. 3006, 11 (January 29, 1971)

This article describes how drum winches might be effectively used in anchor seiners without disrupting conventional deck arrangements. Since some anchor seiners use 15 × 120-fathom coils of rope, or more, a side, single large drums are not practical. But two complete drum winches working together might be. The drum winches would have sets of gears just as modern seine net winches have; coilers would not be required. Each rope would be shot and hauled independently, but the shooting and hauling would have to be synchronized. Two large spools with rollers in between would be installed side by side across the foredeck. The rollers would be of the same diameter as the winch barrels and would hold as much rope as the barrels; thus the quantity of rope usable would be restricted only by the space available and the power required to haul it. To ensure even hauling, each drum would have a revolution indicator; Lebus-type guide gear would be used for spooling. Either a warping drum (with the main drum synthronized to take up the warp) or the main storage drum (controlled by the revolution indicator) could be used to ensure identical hauling speeds.

Pairs of drum winches installed side by side on the aft deck of stern seiner-trawlers would make for safer working conditions, it is suggested. Only one man would be needed to shoot and haul the gear in either an anchor seiner or a seiner-trawler. [1 figure]
LB

2.110 AN ECONOMIC ANALYSIS OF THE U.S. SHIPBUILDING INDUSTRY
(9.2) FOR THE 1970's. VOLUME I.

Beazer, William F., William A. Cox, Curtis A. Harvey, and Nancy L. Watkins (Institute for Defense Analyses, Program Analysis Div., Arlington, Va.)
Rept No. R-159-Vol-1 IDA/HQ-69-10267, 109 pp. (July 1969) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-716-785, PC$3.00, microfiche 95¢.
U.S. Government Research and Development Reports 71, No. 5, 123 (March 10, 1971)

The report examines the effects of alternative shipbuilding programs and government procurement policies on the size and location of the U.S. private shipbuilding industry and on the cost of ships. These effects are estimated from a linear programming model that simulates the activities of 15 private shipyards. The model is used to test the implications of two alternative volumes of shipbuilding, encompassing naval and commercial ships. The smaller program (36 ships per year) is based on a projection of recent actions and plans, while the larger program (about 70 per year) includes much higher rates of both commercial and naval construction. Different delivery schedules are tested for each program. Any set of ship demands could be tested.
Authors' abstract

2.115 VERSATILE DUTCH TRAWLER
(1.0147)

De Boer, E. J. (Technical Research Department, Fisheries Directorate, IJmuiden, The Netherlands)
Fishing News International 10, No. 1, 48-50 (January 1971)

The considerable change in recent years in the Netherlands fleet of near-water trawlers is attributable to the concerted efforts of manufacturers, who have shown a willingness to expand their interest in the fishing industry; of fishermen/owners, who have cooperated with manufacturers and government agencies and have been willing to invest in new developments; and of the Government, which has encouraged the fishermen with financial support. The vessel described here is one of the results of this cooperation.

The 30-m. trawler Tiny Cornelia is made of steel according to the athwarts-frame system. Her hull is divided into six watertight compartments--fore peak with chain locker, crew's cabin, fishhold, engine room, net store, and after peak with steering-gear room. The superstructure is on the forward part of the main deck, the wheelhouse being just forward of amidships. In the wheelhouse are two echo sounders, a radar, an autopilot, a Decca navigator with track-plotter, an intercom, a VHF radio, a radio telephone, and a wireless direction finder; one of the control panels is for the eight-drum main winch (which is located in the engine room), along with auxiliary controls for the main engine, the gearbox, and the rudder. Thus the skipper can watch the work area and perform all necessary maneuvering operations during gear handling.

(over)

2.110 (9.2) AN ECONOMIC ANALYSIS OF THE U.S. SHIPBUILDING INDUSTRY FOR THE 1970's. VOLUME II. APPENDICES

Beazer, William F., William A. Cox, Curtis A. Harvey, and Nancy L. Watkins (Institute for Defense Analyses, Program Analysis Div., Arlington, Va.)
Rept. No. R-159-Vol 2 IDA/HQ-69-10283, 90 pp. (July 1969) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-716 786, PC$3.00, microfiche 95¢.
U.S. Government Research and Development Reports 71, No. 5, 123 (March 10, 1971)

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Authors' abstract

2.115 (1.0147)

Although the Tiny Cornelia embodies several technical improvements worth noting, one of the most interesting is the arrangement of the winches. The winch installation is divided in two parts. The main components are installed in the forward section of the engine room at the tanktop of a crossbunker. A six-drum auxiliary winch is mounted on the bridge deck aft of the wheelhouse. This latter is driven by a chain drive from the drum shaft in the engine room. The vessel is equipped for beam trawling, but if the skipper wants to switch to bottom or midwater trawling, the two center drums of the auxiliary winch can be used for the warps; thus, their wire capacity is larger than that of the drums used for the topping lifts and the gilsons.

Dividing the winch into two parts and placing the heaviest parts below decks not only leaves the whole main deck free for handling the catch, uncluttered by running wires, but improves the stability of the vessel. During beam trawling, the warps coming from the drums in the engine room are guided through a chute to the bridge deck. There the warps run through chutes to tilting blocks mounted at the sides and forward of the wheelhouse. From these blocks, the warps run to the fishing blocks at the top of the booms, an arrangement that decreases the buckling forces on the booms considerably. The booms are made of heavy pipe set perpendicular to the center line of the vessel. They are supported by smaller pipe that runs to a point farther forward. Thus the supporting leg is usually loaded by tensile stress, depending on the inclination of the warps.

Arrangements for sorting, transporting, gutting, washing, storing, and unloading the catch provide for maximum efficiency with minimum inconvenience to and strain on the crew. [8 figures] LB

0.8 (9.19)(0.12) DUST CONTROL AND THE ENVIRONMENT

Waddington, J. N.
Pollution in the Seventies. Suppl. Maint. Engng industr. Process Heat., pp. 43-44, 46-47 (November 1970)
BFMIRA Abstracts 24, No. 4, Abstract No. 1129, 244 (April 1971)

The types of dust control equipment available for removing pollutants from factory air and the factors to be considered when selecting such equipment are outlined. Details of some commercial filters, wet collectors, cyclones, scrubbers and electrostatic precipitators are tabulated. C.C.N. Reprinted

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2.1127 (2.119) FLUOR-LUX SELF-LUMINOUS BAITS

Anonymous
Norwegian Fishing and Maritime News 18, No. 1, 39 (1971)

A new self-luminous, nontoxic, nonradioactive plastic material being marketed in Norway has proved valuable for commercial and sports fishermen alike. In the form of bait, it can be made into small flies and worms for the sports fisherman or into small cuttlefish, large worms, and prawns for the commercial fisherman. Tests on longlines have proved that, with ordinary bait on every third hook, the small luminous S-baits will increase the catch per line by more than 20%. With the luminous bait attached every 7 meters on nets, average results are even better. The material can also be used on board for safety signs or directional guides.

Once activated by daylight or artificial light, the material will remain luminous for several hours. It is resistant to deterioration from oxygen, ultrared light, sea water, abrasion, and acid. No phosphorus is used in its composition. [1 photograph] LB

2.3 SHRIMP PROCESSING

Canadian Patent 859,075
Hice, H. B. (pat.)
Food Technology 25, No. 4, 126, 128 (April 1971)

The device is used to control the curl of peeled shrimp during cooking. FTP

0.12 ECONA PARKAMATIC LARGE CAPACITY WASTE DISPOSER

Anonymous
Fd Trade Rev. 41, No. 1, 36-37 (1971)
BFMIRA Abstracts 24, No. 4, Abstract No. 1162, 250 (April 1971)

Now available is a waste disposal unit that has a capacity of up to 1500 lb per hour, and is said to be suitable for abattoirs and food processing plants. Reprinted D.B.

2.113 BIOLOGICAL STUDY OF ANTIFOULING PAINTS. I. BIOASSAY ON ANTIFOULING CHEMICALS

Mawatari, Shizuo, and Hauro Kitamura (Japan)
Chemical Abstracts 74, No. 7, 31049e (February 15, 1971)

2.12 PHOTOGRAPHY UNDER WATER
(0.112)(9.6)

Smith, P. A. (reviewer)
In-water Photography: Theory and Practice, xiii + 391 pp.
Lawrence E. Mertens
Wiley Series on Photographic Science and Technology and the Graphic Arts; published by Wiley-Interscience, New York and London (November 1970). £9.50
Nature 230, No. 5292, 311-312 (April 2, 1971)

This book, says the reviewer, is invaluable to photographers and divers, and to engineers and designers who have anything to do with underwater equipment or systems involving optical, photographic, or visual aids. The extensive bibliography following each chapter permits the specialist to develop any aspect of the subject that could not, of necessity, be covered in detail in a single volume.

The first part of the book describes the water environment and the great variety of conditions that exist there at different times and places. The transmission of light in water--the way it is attenuated, selectively absorbed and scattered--and how this phenomenon affects the apparent contrast of objects and the resolution of small detail are thoroughly covered. Possible methods of improving image quality under inherently bad conditions are explained. The use and construction of both diver-operated and remotely controlled units for housing still, cine, and television cameras are described, as is the electronics applicable to television systems, image tubes, vidicons, image orthicons, and image intensifiers. Biological aspects of light and color and of microscopic animal and plant life in the sea (the conditions in which they live and their reaction to light)

(over)

2.143 WATER TEMPERATURE GUIDE TO SHRIMP AND TUNA

Anonymous
Fishing News International 10, No. 1, 34, 37 (January 1971)

The Expendable Bathythermograph (XBT) System was originally developed for use by the Navy in locating the thermocline in various areas of the world's oceans. Now it is being tested for efficiency and cost-effectiveness on board tuna clippers, albacore trollers, shrimp boats, offshore lobster boats, and herring boats. Since it can give the skipper an immediate, easily read picture of the ocean's temperature structure throughout the particular depth range of a given fish, it enables him to set his nets for maximum catching efficiency--or not to set them at all, if unproductive temperature conditions prevail. It also reduces search time by identifying areas of upwelling and current boundaries, thereby helping him locate the best temperature conditions for a given species.

Tests on board tuna vessels showed that the rate of success of purse seining for tuna in the Eastern Pacific is clearly related to both the depth of and the temperature gradient within the thermocline. When the top of the thermocline did not exceed 60 ft., sets were 58.2% successful; when it was deeper, sets were only 42.3% successful. When the mean temperature gradient within the thermocline was as sharp as 0.3° F./ft., sets were 55.5% successful; when it was more gradual, sets were only 45.1% successful. A large gradient combined with a shallow thermocline gave 63.9% success, whereas a small gradient and a deep thermocline gave only 39.9%.

Tests on board a modern shrimper working out of a Gulf Coast port gave equally good results. The royal red shrimp live at depths ranging from 200 to 300 fathoms. They do not burrow into the bottom. Commercially worthwhile numbers are found in

(over)

2.15 CAREFUL HANDLING COULD BOOST THE VALUE OF SAITHE LANDINGS
(1.55)(3.4)

Anonymous
Handling and Processing Saithe, Torry Advisory Note No. 47
Smith, J. G. M., and R. Hardy (New Products and Processes Section, Torry Research Station, P.O. Box 31, 135 Abbey Road, Aberdeen AB9 8DG, Scotland)
Fishing News No. 3007, 8 (February 5, 1971)

The authors prepared this research note in the belief that a market could and should be developed for saithe (Pollachius virens). Because its flesh is darker and therefore less attractive than that of cod, a related species, it is not as highly prized as cod--for example, between 1965 and 1969, the average price for saithe was £34 a ton; for cod, £74 a ton. Nevertheless, many people consider its flavor superior to cod's. The authors suggest that improvements in handling at sea and during processing and distribution on shore could make saithe an important food fish.

On board, saithe should never be thrown about the deck, for bruises and bloodstains only mar the appearance of the flesh further. They should be bled as soon as possible after being caught, within 30 minutes if possible, to reduce discoloration, and they should be stowed carefully in ice. (They should not be mixed with other species, for their dark slime has a discoloring effect.) Dipping the fish in chemical solutions will not reduce the intensity of color--only bleeding will. However, the dark brown layer of flesh can be removed in a deep-skinning machine. Although this layer constitutes 10 or 15% of the original weight of the fillet, it need not represent waste; for it can be used in fish cakes, pies, chips, sausages, and other products where the flesh is masked or covered with batter or bread crumbs.

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2.15 DUTCH ON-BOAT SORTER FOR SMALL SHRIMPS
(1.85)
Anonymous
Fishing News International 10, No. 1, 33-34 (January 1971)

Shrimp fishermen in the Netherlands cook market-sized shrimp on board; they dry any undersized shrimp that may be caught and sell tham as fodder or chicken feed. Because of the adverse effect of this practice on stocks, the Netherlands Technical Fisheries Research Department has developed a device for separating small shrimp from the catch and returning them to the ocean alive.

The machine consists of two coaxial cylindrical sieves that are rotated with ample quantities of sea water. The inner sieve retains the fish, crabs, mussels, starfish, etc., that are moved through the machine with the sea water (pumped in at a minimum rate of 200 liters per minute at a pressure of at least 0.5 kg./cm.^{2}). It allows shrimp and tiny fish to pass through to the outer sieve, which retains the marketable shrimp. The undersized shrimp, tiny fish, and sea water are discharged overboard through a wide tube. In addition to such obvious advantages as more shrimp of better quality per haul, improved efficiency, and less damage to the fishery, the machine makes possible the mechanization of much of the handling required on board. Under development is a handling system in which the machine will be fed by conveyor belt from a catch-holding bunker, or by a fish pump from a wet tank, and another belt will take the shrimp from the sorting machine to the cooker.

Strongly convinced of its value to the fishery, the Netherlands government gives a grant of about £340 to every shrimp fisherman who buys it (at a cost of some £1,200). In addition, the government gives a subsidy of 7s a kilo to landed shrimp of prime quality. [1 figure] LB

2.143

the narrow temperature range of about 49% to 51° F. Using the XBT and gear developed at the National Marine Fisheries Service gear laboratory at Pascagoula, Miss., the researchers made eight tows at depths ranging from 1,225 to 1,690 ft. They tried to make the tows in waters as close to 49° F. as possible (actually the temperatures, which were taken at both start and end of the tows, ranged from 46.7° to 49.7° F.). Despite the fact that two of the eight tows fouled and yielded no shrimp, 1,185 lb. of royal red shrimp was caught in 21 hr.

The XBT system consists of a recorder, which provides a complete temperature-depth chart; a small, ballistically shaped, expendable probe containing a thermistor, which is joined by a spool of fine wire to the recorder, and a spin stabilizer; and a probe launcher, a simple gravity device consisting of a loading breech, a discharge tube, and a recorder-connecting cable. Operation is simple, taking only a few seconds; the vessel need not be slowed or stopped during launching. The probe canister is inserted in the launcher, a release pin is pulled, and the recorder is automatically triggered when the probe hits the water. Until the probe-wire spool is exhausted, the recorder will plot a continuous trace of temperature against depth. [3 figures, 1 table] LB

2.3 FISH PROCESSING

Japanese Patent 33735/70
Nordischer Maschinenbau Rudolf Bardel. (pat.)
Food Technology 25, No. 4, 128 (April 1971)

The apparatus sequentially removes the gills and the entrails from fish. FTP

3.15 (3.9) A SYSTEM FOR CONTINUOUS THERMAL PROCESSING OF FOOD POUCHES USING MICROWAVE ENERGY

Kenyon, Ernest M., D. E. Westcott, P. La Casse, and J. W. Gould (U.S. Army Natick Laboratories, Natick, Mass.)
Journal of Food Science 36, No. 2, 289-293 (March 1971)

The purpose of this study was to design and to test the feasibility of a new system using microwave energy for the continuous thermal processing of food pouches--a process that would produce products of improved quality and that would be economical. This paper describes the design and construction of a system for continuous microwave sterilization of foods packaged in plastic pouches and reports on some tests with its use. Air pressure was applied to the system to prevent the heated food pouches from rupturing. The sealed pouches containing the food are introduced through an air lock onto a conveyor inside a plastic pipe within a microwave cavity. Microwave energy is applied up to 10 kw. at 2,450 MHz. The process time and temperature of the product is controlled by the speed of the conveyor. The food pouches are cooled in a water bath. The pouches were overwrapped in a foil laminate (3 mil polyolefin, 0.35 mil aluminum foil, 0.5 mil polyester). Two products were tested--chicken a la king and frankfurters. Typical engineering characteristics of the microwave continuous processor are:

Feed rate:	1 pouch/min.	Power range:	1.25-10 kw.
Time in cavity:	1-12 min.	Over pressure:	0-40 lb./sq. in.
Cooling time:	5 min.	Dielectric temperature rise:	20°-30° F.
Pressurization time:	1 min.	Belt length:	24.5 ft.
Optimum load:	2-5 #(6-14 pouches)	Cavity belt length:	9.7 ft.
Belt speed:	0-7 ft./min.		

[10 figures, 1 table, 8 references] FTP

2.12 (0.112)(9.6)

are described. The final chapters deal with possible applications for photographic systems. They cover the design stages of a system for surveying a hypothetical population from the ocean floor; new techniques and possible future developments that could significantly extend the present rather limited visible range in the oceans; and, briefly, modern diving techniques. LB

2.3 FISH MOLDING APPARATUS

Canadian Patent 858,493
Hansen, G.; A. Espersen A/S (pat.)
Food Technology 25, No. 4, 126 (April 1971)

The molds, used for stuffing the meat of fish, are shaped in the form of fish fillets. FTP

2.15 (1.55)(3.4)

The fillets may also be smoked much as cod fillets are. In this process, they are brined (80° salinometer) for from 4 to 10 min. in a bath to which an amber dye has been added, left to drip for 2 hr., and then smoked at 27° C. for 3 or 4 hr. in a mechanical kiln. Another suggested use of the fish is "smoked seelachs," or smoked delicatessen saithe, a product developed in Germany during World War I.

This advisory note may be obtained free from Torry Research Station. LB

2.3 FISH LIVER PROCESSING

Canadian Patent 857,006
Nordischer Maschinbau Rud. (pat.)
Food Technology 25, No. 4, 126 (April 1971)

The apparatus is used to remove the liver from the belly cavity of a fish. FTP

3.12 SEAFOOD PROCESS AND APPARATUS

Satz, M. V., L. A. Edwards, and T. Livesey; Calgon Corporation (pat.)
British Patent 1,219,020
BFMIRA Abstracts 24, No. 3, Abstract No. 919, 196 (March 1971)

A means of spraying fish fillets with 'dips', such as phosphates, is described. Reprinted

3.15 (2.01) STORAGE TEMPERATURE EFFECTS ON THE PROTEOLYTIC ACTIVITY OF RADIATION-SURVIVING BACTERIA IN OYSTERS

Liuzzo, Joseph A., Mohammed K. Farag, and Arthur F. Novak (Department of Food Science, Louisiana State University, Baton Rouge, La. 70803)
Journal of Food Science 36, No. 2, 287-288 (March 1971)

In 1968, J. A. Liuzzo, M. K. Farag, and A. F. Novak [Journal of Food Science 32, 678] isolated and identified 10 species of bacteria from raw oysters that had been treated with a low-dose of gamma irradiation. They found, too, that the irradiation treatment (200-300 Krad) had reduced considerably the proteolytic activity of the surviving bacteria. In the present study, the authors determined the combined effects of radiation and low-temperature storage of oysters (under practical conditions) on the proteolytic activity of four of the radiation-surviving bacteria. The bacteria were Pseudomonas erythra and Achromobacter butyri (both highly proteolytic) and Neisseria flavescene and Bacillus laterospores (less active proteolytically than the preceeding two). The oysters were packed in pint-size cans (to simulate practical conditions) and the product was stored in ice (32° F.) and at 40° F. for 15 days. Radiation doses that were applied were 100 and 800 Krad. The test bacteria were added directly to the oysters in the pint cans.

The activity of P. erythra and A. butyri was greater than that of N. flavescene and B. laterspores in oysters held at both temperatures (32° F. and 40° F.) and treated with both radiation doses (100 and 800 Krad). The gamma irradiation treatment did not cause autolysis of the oyster tissue. Neither the untreated (nonirradiated) nor the irradiated oysters showed significant increases in proteolytic activity when they were stored in ice (32° F.) for 15 days; the nonirradiated

(over)

3.2345 FREEZE CONCENTRATION BY DIRECTIONAL COOLING

Kramer, Amihud (Department of Horticulture, University of Maryland, College Park, Md. 20742), Kohmei Wani (present address, Snow Brand Milk Products Company, Tokyo, Japan), James H. Sullivan, and Ilan Shomer
Journal of Food Science 36, No. 2, 320-322 (March 1971)

D. K. Tressler and M. A. Joslyn ["Fruits and Vegetable Juice Processing Technology," AVI Publishing Co., Westport, Conn. (1961)] indicated that, during freezing of foods, water is removed from solution and transformed into ice crystals of variable but rather high degree of purity; the remaining material is left successively in a more concentrated state. The present authors stated that it is generally assumed that as food materials are frozen, soluble solids move ahead of the "ice front." They carried out experiments to determine whether the concentration of solids ahead of the freezing front is dependent upon direction of freezing. Under the conditions used in the present studies, they found that the soluble solids moved ahead of the ice front only when the ice front moved in a descending direction. When foods are frozen in an ascending direction (as on a plate freezer) little, if any, movement of solids takes place. When the freezing surface was at the top of the material to be frozen, a rapid downward movement of solids took place. This "descent of solids" was more apparent in true solutions (drinks) than in structural cellular foods (meat, potatoes). The authors suggest that this phenomenon may be used to advantage for more efficient freeze drying or concentrating, or for the simultaneous production of low-solids and concentrated foods (particularly beverages).
[3 figures, 1 table, 6 references] FTP

3.15 PRESERVATION OF FOOD BY IRRADIATION: PRELIMINARY STUDIES ON COMMERCIAL SHRIMP

Woodhouse, Denise Micheline Rostan (Universidad Nacional Autonoma de Mexico, Mexico City. Facultad de Ciencias)
Thesis, 111 pp. (1970) (In Spanish) (U.S. sales only) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. NP-18393.
Nuclear Science Abstracts 25, No. 6, 1093, 1094 (March 31, 1971)

Studies were made to determine the radiation dose needed for the preservation of commercial shrimp, using ^{60}Co source with γ energy of 1.25 Mev. The interaction of γ radiation with matter and the chemical and biological effects of radiations are first reviewed. A detailed description is then given of the techniques used. The sterilization dose for shrimp was established as 3 Mrads. Irradiated samples were then stored for seven mon. at room temperature and 0°C and compared with non-irradiated samples stored under the same conditions. There was s significant discoloration and a decrease of the odor in the non-irradiated samples. A normal consistency was however maintained in the irradiated samples, whereas the non-irradiated controls were almost completely disintegrated. The type of modifications caused by the irradiation in the volatile nitrogen constituents was also determined. There was a decrease of from 5 to 40% in the total volatile nitrogen; from 5 to 25% in trimethylamine nitrogen; and from 9 to 49% in the aminic nitrogen. (J.S.R.)
Reprinted

3.236 (3.335)(1.84) SCALLOP 'WASTE' SERVED AS DELICACIES

Anonymous
Fisheries of Canada 23, No. 3, 18 (February 1971)

For years Canadian scallop fishermen have been shucking their catch, keeping the muscle, and throwing the rest over the side. But, says Louis Lipton, a food technologist who has been working on a scallop-development project under contract with the Industrial Development Branch of the Canadian Department of Fisheries and Forestry, the roe and the ring represent 50% of the scallop--and they contain more food value than the muscle that is kept. Thus every year the fishermen are wasting millions of pounds of scallop. Technologists working on the development project have come up with about 20 ways of canning and freezing the roes and rings. At a demonstration luncheon held recently for government and fishing-industry representatives, they served the "waste" in the form of deep-fried fish balls and cakes that had been dipped in a batter containing, among other ingredients, bread crumbs, corn-flake crumbs, corn meal, and various spices. Reaction of the tasters was, as a rule, enthusiastic.

Scallops are suitable for harvesting off Canada's East Coast from April till August. LB

3.234 FREEZING OF TROPICAL FISH
(0.6)(1.01512)

Bose, Arabindo N. (Cent. Inst. Fish. Technol., Ernakulam, India)
Chemical Abstracts 74, No. 1, 2705k (January 4, 1971)

3.15 A RESEARCH NOTE.
(0.5) RADIATION DESTRUCTION OF VIBRIO PARAHAEMOLYTICUS

Matches, Jack R., and J. Liston (Institute for Food Science and Technology, College of Fisheries, University of Washington, Seattle, Wash. 98105)
Journal of Food Science 36, No. 2, 339-340 (March 1971)

Vibrio parahaemolyticus has been isolated from seafoods in the United States [J. Baross and J. Liston, Applied Microbiology 20, 179 (1970)]. If radiation is to be used to prolong the storage life of seafood, it must be sufficient to free the food product from low numbers of pathogens that might be present and grow during mishandling of the product. In this study, the authors found that Vibrio parahaemolyticus can be controlled easily in seafoods by exposure to pasteurizing doses of irradiation.
[1 table, 8 references] FTP

3.15 (2.01)

oysters showed significant increases in proteolytic activity when stored at 40° F. for 15 days. These results demonstrate the advantage of low-dose irradiation for preserving raw oysters but they do emphasize the importance of subsequent ice storage for retarding bacterial growth and metabolic activity (thus for retarding spoilage of the oysters). The authors noted a slight decrease in pH in both the nonirradiated and the 100 Krad-irradiated oysters after 15 days' storage--apparently the decrease in pH corresponded to the increase in bacterial numbers.
[4 tables, 10 references] FTP

3.2344 FREEZING FISH

British Patent 1,215,089
A. Espersen A/S, Ronne, Bornholm, Denmark (pat.)
Refrigeration and Air Conditioning 74, No. 877, 84 (April 1971)

Individual pieces of fish are frozen in molds in the shape of a complete fillet. FTP

3.2345 IMPROVEMENTS IN OR RELATING TO THE PREPARATION OF BLOCKS OF FROZEN EDIBLE MATERIAL

British Patent 1,223,159
Eisenwerke Kaiserslautern GMBH (Federal Republic of Germany) (pat.)
BFMIRA Abstracts 24, No. 4, Abstract No. 1219, 261 (April 1971)

The object of the invention is to enable fish to be converted into deep-frozen fillet packs whilst retaining the texture of the fish in a fresh condition, and at the same time ensure frozen slabs of a predetermined, uniform, shape and size. This is achieved by first freezing the filleted fish, and then compressing the frozen fillets. Reprinted

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3.15 PRESERVATION OF FRESH FISH BY IONIZING RADIATION
(2.15)

Bagge, Erich, and Helmut Voelcker (Schlottau, Rolf) (pat.)
German Offen. (Patent) 1,926,377 (Dec. 3, 1970)
Chemical Abstracts 74, No. 7, 30884m (February 15, 1971)

Packs of fresh shrimp inoculated with 0, 10^2, 10^4, or 10^6 spores of Clostridium botulinum type E (Beluga strain) per gram of shrimp, and subsequently γ irradiated at levels of 0, 100, or 200 Krad, were incubated at temperatures of 38, 42, 50, or 70° F. The day of total consumer rejection, as determined by an informal panel of nonexperts, was noted for each permutation, and total plate counts were determined for each on the day of rejection. The time required for the development of toxicity in each permutation, and the type of botulism involved, were determined by mouse protection testing. (auth.) Reprinted

3.15 INOCULATED PACK STUDIES ON LOW-DOSE IRRADIATED MARINE PRODUCTS: SHRIMP

Ward, B. Q. (Miami Univ., Rosenstiel School of Marine and Atmospheric Sciences, Miami, Fla.)
Final Report, Contract AT (40-1)-3698, 43 pp. (Dec. 1970) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. TID-25556.
Nuclear Science Abstracts 25, No. 5, 847 (March 15, 1971)

3.237 NOTES ON THE ESTIMATION OF THE BREADED PORTION OF BREADED DEEP FROZEN FISH PRODUCTS (8.8)

Hensel, G., and J. Wurziger
Arch. Lebensmittelhyg. 21, No. 12, 273-276 (1970)(In German)
BFMIRA Abstracts 24, No. 4, Abstract No. 963, 207 (April 1971)

A table is given of the results of analysis of various types of fish fingers coated with breadcrumbs. Figures are given for gross and net weights of fish and breadcrumbs and the proportion of fish and of breadcrumbs in the product. Water, fat, starch and protein content of the breaded fish products was also given along with the total trimethylamine-nitrogen. C.S.B. Reprinted

3.330 POPULATION DISTRIBUTION OF HEAT RISE CURVES AS A SIGNIFICANT VARIABLE IN HEAT STERILIZATION PROCESS CALCULATIONS

Herndon, David H. (Management Recruiters of the Peninsula, Inc., 2600 Washington Ave., Newport News, Va. 23607)
Journal of Food Science 36, No. 2, 299-305 (March 1971)

Process calculations using the traditional slowest slope index gives only a rough approximation of the process time to achieve commercial sterility. Even then, the addition of safety factors followed up by inoculated test pack studies may be necessary to establish an acceptable commercial process. Attempts to predict levels of sterilities for process times over a range of inoculated packs are usually far off the true levels when predictions are based on the slope index of the slowest heating package. This article describes a method for predicting sterilization values (with high correlation to results of actual inoculated test packs) by using the population distribution of the slope indices from a sample of heat rise curves instead of the traditional slowest or mean single value of slope index in the sterilization calculations. A computer was programmed to calculate (from the basic equations of thermal death times and of heat penetration) the amount of sterilization achieved at designated time intervals in a population of food packages. Means and standard deviations of slope indices from both real and postulated heat penetration tests, together with specified processing conditions, were fed into the computer. The author found that the predicted spoilage levels were very close to those obtained from actual inoculated test packs. He demonstrated, from input of postulated heat penetration values, that the larger the standard deviation the greater the error will be if only a single value of

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3.334 (3.9) HEAT PASTEURIZATION OF CRAB AND SHRIMP FROM THE PACIFIC COAST OF THE UNITED STATES: PUBLIC HEALTH ASPECTS

Lerke, Peter, and Lionel Farber (The G. W. Hooper Foundation; Seafood Research Laboratory, 1950 Sixth St., Berkeley, Calif. 94710)
Journal of Food Science 36, No. 2, 277-279 (March 1971)

This article is a report of a study of the feasibility of heat pasteurizing Pacific Coast shrimp and crab meat. To help make this assessment the authors examined: (1) the incidence of the potential pathogens on shrimp and crab meat that had been prepared in the San Francisco area, (2) the effect of heat pasteurization on these pathogenic bacteria, (3) the ability of crab and shrimp meat substrates to support growth of these organisms, and (4) the temperature of storage required to prevent multiplication of the bacteria (in the event that certain bacteria survived the pasteurization process or that the product became contaminated postpasteurization).

The Dungeness crab Cancer magister and the shrimp Pandalus jordani were used in the tests. Six ounces of meat were packed in 6- by 8-in. Mylar-polyethylene pouches; the packages were not more than 1 in. thick when filled. The air was squeezed out of the pouches and the pouches were then heat sealed. The filled and sealed pouches of meat were pasteurized in a water bath held at 185° F.; the products were heated for 1 or for 5 min. after they had reached an internal temperature of 180° F. Seventy-four samples of crab meat and 54 samples of shrimp meat were examined.

No salmonella or Clostridium botulinum were isolated from 74 samples of crab; no salmonella were isolated from 24 samples of shrimp; and no C. botulinum were

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3.330 THEORETICAL FORMULAS FOR TEMPERATURES IN CANS OF SOLID FOOD AND FOR EVALUATING VARIOUS HEAT PROCESSES

Hayakawa, Kan-Ichi, and C. Olin Ball (Food Science Department, Rutgers University--The State University, New Brunswick, N.J. 08903)
Journal of Food Science 36, No. 2, 306-310 (March 1971)

Many formulas for the heat conduction in finite cylinders have been published and a few formulas are available that are applicable to the heat process estimation. Such formulas were devised by assuming simplified relationships between the surface temperature and processing time; therefore, they cannot be used when complex relationships between the two variables exist. In this article, the authors derived formulas for the transient temperature distributions for various time variable surface temperatures frequently observed in the commercial heat process.

The authors obtained general solution for transient temperature distributions in a finite cylinder by applying several integral transformations to heat conduction equation when it is subjected to time variable surface temperature. From this general solution, they derived various formulas for temperature distributions for five different surface temperature-processing time relationships. By using the derived formulas, formulas for two parameters were obtained: slope indices and intercept coefficients of heating or cooling curves of cylindrical cans of conductive food. Also, expressions were derived for estimating sterilizing values during a come-up period of the heat process and also during the sinusoidal fluctuation of retort temperature.
[1 figure, 2 tables, 14 references] FTP

3.60 FABRICATION OF FOOD BARS BASED ON COMPRESSION AND MOLDING MATRICES

Pavey, Robert L.
Final Rept. 23 Sep 68-22 Sep 69, Contract DAAG17-67-C-0068, 39 pp. (June 1970) (Swift and Co., Research and Development Center, Chicago, Ill.) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-717-289, PC$3.00, microfiche 95¢.
Government Reports Announcements 71, No. 6, 37 (March 25, 1971)

Dried foods, some plasticized to prevent fragmentation, were compressed with appropriate binders into bars of approximately equal size, density and caloric content. Bars representing the following food items were designed, formulated, fabricated and evaluated for physical, chemical and sensory characteristics after storage for 3 months at 38 C: (1) Citrus Fruit Drink (2) Hot Chocolate Beverage (3) Cream of Mushroom Soup (4) German Potato Salad (5) Cole Slaw (6) Pineapple-Cottage Cheese Salad (7) Welsh Rarebit (8) Crab Meat Cocktail (9) Chocolate Pudding (10) Pineapple Fruit Pudding. Complete information on all formulations and processing is supplied. In accordance with design requirements bars were rated by a taste panel as acceptable for consumption from the dry-compressed state and for consumption after rehydration for 20 minutes in water at 70C. (25C for items consumed at room temperature.) Bars were evaluated for cohesiveness, dimensional stability under pressure, ease of shear by the incisors, and subsequent mastication. Observations on free fatty acids, peroxide value and browning (fluorescence units) are recorded for each bar at the time of fabrication and after the referenced storage. (Author)
Reprinted

3.4 HOW TO PRODUCE GOOD KIPPERS
(1.22)(3.2340)

Anonymous
Kippers, Torry Advisory Note No. 48
Bannerman, A. McK. (Torry Research Station, P.O. Box 31, 135 Abbey Road, Aberdeen AB9 8DG, Scotland)
Fishing News No. 3007, 9 (February 5, 1971)

This advisory note explains what a kipper is; how the raw material should be handled; and how the product should be processed, stored, and distributed. A kipper is defined as "a fat herring with guts and gills removed, split down the back from head to tail, lightly brined, dyed if desired, and cold smoked at an air temperature no higher than 30° C." The best kippers are made either from fresh fish or from fish properly refrigerated until frozen. These latter should be glazed or closely wrapped in polythene film to reduce dehydration and rancidity during cold storage; storage should be at -30° C. for no more than 8 months.

In commercial practice, most of the kippering process is done by machine. Continuous briners eliminate many of the problems posed by batch briners, and mechanical kilns many of the disadvantages of the traditional chimney kilns. Use of wire-mesh trays rather than tenter hooks for draining the brined, split fish just before it is smoked eliminates a laborious, time-consuming step in the process. However, to prevent small pools of brine (or white patches of salt) from being retained in the belly cavity of fish left to drip on trays, the author suggests that the fish be tumbled in a rotating, perforated drum before they are laid on the trays. Advice is also given for those who would like to make kippers at home.

This advisory note may be obtained free from the author's address.

[2 figures] LB

3.61 THE CENTRIFUGAL FLUIDIZED BED. 2. DRYING STUDIES
(3.63) ON PIECE-FORM FOODS

Lazar, M. E., and D. F. Farkas (Western Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Albany, Calif. 94710)
Journal of Food Science 36, No. 2, 315-319 (March 1971)

Apparently, a rational theory for drying piece-form foods has not been developed because the properties that govern the drying rates have not been identified or quantitatively characterized. In the present work, the researchers studied the behavior of food pieces (potato, apple, and carrot) exposed to high-rate drying environments. The experiments were designed to show the drying characteristics of real systems under select conditions in order to gain an insight into the mechanisms involved during the early phases of high-rate drying when food pieces shrink and skin layers form.

Two experimental test drying units were used. The first was a bench unit for single pieces and was used for preliminary studies. The second was a pilot plant centrifugal fluidized bed dryer [D. F. Farkas, M. E. Lazar, and T. Butterworth, Food Technology 23, 1457 (1969)].

The authors found that drying food pieces, even partial drying, in a centrifugal fluidized bed with relatively high air flows may be self limiting. Increases in the rate of drying in the initial stages may be more than offset through rate-retarding effects of a skinlike layer of collapsed surface tissue that forms on the pieces. The skin layer that forms becomes increasingly resistant to transfer of heat and moisture.

[9 figures, 4 tables, 10 references] FTP

3.330

the slope index is used. Manual procedures for accurate determination of the minimum process time required for sterilization are described. The author also gives methods for expansion of data to show a curve illustrating the complete relationship between process time and food sterility.

[4 figures, 2 tables, 12 references] FTP

3.334 (3.9)

isolated from 54 samples of shrimp. Large inocula (10^7 and 10^8 cells) of staphylococci and salmonellae introduced into packages of the products were destroyed by the pasteurization process of 1 min. at 180° F. When the products were pasteurized by processing for 5 min. at 180° F., some members of an inoculum (10^3 spores) of C. botulinum type E survived. Storage of the pasteurized crab and shrimp meat at 40° F. prevented the growth of all staphylococci and salmonella tested, but spores of C. botulinum type E grew and produced toxin after 30-40 days of storage. No toxin could be detected in the packs inoculated with C. botulinum type A or proteolytic type B spores and held at 50° F. or lower. Dipping the meats in 0.1% solution of sodium benzoate, with or without fumaric acid, did not prevent the growth of and toxin formation by C. botulinum types A, proteolytic B or E.

The authors concluded that crab and shrimp pasteurized as described must be stored at 36° F. or lower at all times. However, they believe that it is not now feasible to maintain such storage conditions in commercial channels or in the home and that the chance of danger exists.

[3 tables, 10 references] FTP

3.60 FISH DEHYDRATION

Japanese Patent 3373970
Canadian Pat. & Dev. Ltd. (pat.)
Food Technology 25, No. 4, 128 (April 1971)

Fish meat and carbohydrate food (mashed potatoes) are mixed together, then sliced and dried to a moisture content of about 15%. FTP

3.33 STERILIZATION OF PROCESSED FOODS

Anonymous
Ref. Conserve 27, No. 9, 169-175 (1970) (In French)
BFMIRA Abstracts 24, No. 1, Abstract No. 181, 38 (January 1971)

The authors' summaries of five papers read at a symposium on the problems of sterilization of processed foods, held in Munich on 15th and 16th April, 1970 by the Deutsche Gesellschaft für Ernährung, are reported. The papers summarized are: 'Modern heat sterilization technology,' by K. Paulus; 'Sterilization of food products in flexible packages,' by R. Becker; 'Fish and fish products,' by V. Meyer; 'Heat sterilization of fruits, vegetables and juices,' by P. Nehring; and 'Improving the organoleptic quality of canned meats,' by F. Wirth. Further summaries are to be published in a future issue of the Journal. C. C. N. Reprinted

3.61 EFFECT OF NEAR INFRARED ENERGY ON RATE OF FREEZE DRYING OF BEEF
1. CHAMBER PRESSURE AND RADIATION INTENSITY

Burgheimer, F., M. P. Steinberg, and A. I. Nelson (Department of Food Science, University of Illinois, Urbana, Ill. 61801)
Journal of Food Science 36, No. 2, 270-272 (March 1971)

Freeze drying of foods is expensive. A cube of beef, for example, must be exposed to the freeze-drying process for about 12 hr. to achieve a moisture level below 4%. Reducing the drying time would reduce the cost. Drying time could be reduced by increasing the rate of mass transfer or by increasing the rate of heat transfer. The overall objective of this study was to evaluate the use of infrared radiation as the energy source for freeze drying beef. To obtain information leading to achievement of this objective, the researchers tested the effect of two variables on the drying rate of beef: (1) the level of pressure within the drying chamber (three levels were used: 3.5-4.50 mm. Hg, 1.65-2.20 mm. Hg, and 0.70-0.95 mm. Hg.) and (2) the intensity of the radiation source (the intensity was varied by adjusting the distance between the source and the product).

One-inch-thick slices of eye of the round of beef were used. A 500-watt quartz iodine lamp served as the radiation source.

When the chamber pressure was reduced, the freeze drying rate increased, especially during the early stages of the drying cycle (corresponding to the initial and constant rate periods). For distances between radiation source and product of 9, 13.5, and 18 in., the inverse-square law was not followed--the drying rate was faster than predicted and appeared to vary linearly with distance. In an actual drying situation, therefore, the infrared heater-to-product distance can be varied by a few inches without greatly affecting drying rate.

[3 figures, 1 table, 15 references] FTP

3.63 EFFECTIVENESS OF PNEUMATIC CONVEYING SYSTEMS FOR COOLING SPRAY-DRIED FOOD PRODUCTS

Heldman, D. R. (Agricultural Engineering and Food Science), P. Y. Wang, and A. C. Chen (Agricultural Engineering Department, Michigan State University, East Lansing, Mich. 48823)
Journal of Food Science 36, No. 2, 311-314 (March 1971)

In most systems, cooling of spray-dried food products is accomplished by mixing the dry product with room temperature or cool air followed by conveying the product through a tube to the separators. Normally, use of room temperature air and long conveying tubes is adequate to cool the product. However, sometimes in certain areas of the United States the ambient temperatures become too high for adequate cooling of spray-dried food products. The objectives of this investigation were (1) to learn more about the mechanism of cooling of the product during the initial mixing as product and air temperature come to equilibrium and (2) to determine the effectiveness of supplemental cooling of the conveying wall on the cooling of the product. The first objective was reached by performing an enthalpy balance on a section of conveying tube and solving the equations for air and product temperature as a function of distance. At locations beyond the equilibration regions, the authors determined the effect of forced-air movement and water spraying over the exterior portions of the conveying tube.

The authors derived and solved differential equations that described the product and air temperatures as a function of distance from the initial mixing point. The predicted results were compared to experimental data that were obtained in a conveying tube equipped with thermocouples. The equilibrium temperature of the air-product mixture could be predicted and it was a function of the loading ratio.

(over)

6.131 (0.8) HEAT AND MASS TRANSFER IN A BATCH DRY RENDERING COOKER

Herbert, L. S., and T. E. Norgate (Division of Chemical Engineering Commonwealth Scientific and Industrial Research Organization, Clayton, Victoria, Australia 3168)
Journal of Food Science 36, No. 2, 294-298 (March 1971)

Data were obtained in 23 runs in which inedible sheep offal were processed in a full-scale batch dry rendering cooker at a commercial plant. Particular reference was made to the heat transfer aspects. Such information is useful in the evaluation and design of new rendering processes. The authors calculated the overall heat transfer coefficients for jacket and shaft for a typical offal run and for a run in which water only was charged.

For the offal run, the heat transfer coefficients declined rapidly from about 170 Btu/ft^{2}hr°F to 70 during the first hour and the low value persisted for the remaining hour of the cycle. For the water run, the coefficient values declined gradually from 170 Btu/ft^{2}hr°F to 130 over a 2-hr. period. The observed changes in the offal cook could not be explained by changes in heat transfer area caused by shrinkage of volume of contents during the cycle. Alternatively, the authors suggested, by way of explanation, that as evaporation of water proceeds, a phase inversion occurs from a tallow-in-water dispersion initially in the cooker, to a water-in-tallow dispersion. Further, a decline in the heat transfer coefficient sets in when tallow becomes the continuous phase; a minimum value is reached when all water droplets have disappeared and the remaining water is present only as "bound" water in the protein particles.

[4 figures, 4 tables, 2 references] FTP

6.190 COMMENTS ON THE AVAILABILITY OF NUTRIENTS IN FEEDSTUFFS

Almquist, H. J. (Rt. 1, Box 90, Kelseyville, Calif. 95451)
Feedstuffs 43, No. 15, 26-27 (April 10, 1971)

Not all of the total amount of a given nutrient in a feed may be available to the animal that eats the feed. Nevertheless, feed formulators provide tables of average nutrient composition that give both the expected total amount and the available amount of a nutrient, on the assumption, apparently, that after the availability has been estimated at one level of feeding by suitable assay procedures, it should be equally valid at other levels. Such an assumption is unfounded. The potency or availability of one form of a given nutrient cannot always be expressed in terms of another form, or of a standard, except at a chosen level of comparison. That is, the relation at one level does not always apply at other levels of intake, the systematic drift usually widening as the level of intake rises. (See figures on the back of the card.) This drift has commonly been attributed to experimental deviations or the like--the possibility of an indefinite or changing availability has not been recognized.

The author reviews the results of experiments in which he and other authors have tested this possibility in terms of the lysine, methionine, and phosphorus supplied by commercial soybean meal, fish meal, corn meal, and meat scrap to diets fed at varying levels to chicks. He draws three conclusions. (1) When the availability or potency of a nutrient is lowered because of the form, compound, or carrier from which the functional form is released with difficulty, its biological activity may systematically diverge from that of a standard; thus no definite or general availability can be established on the basis of singular test results. (2) When the biological activity approaches the actual or average total

 (over)

3.63

Increasing the loading ratio decreased the distance required to reach the equilibrium temperature. After the mixture reached equilibrium temperature, the effectiveness of the cooling of the product was a function of conditions at the conveying wall. Water spray over the exterior surface of the conveying tube wall was more effective than forced-air circulation, which, in turn, was more effective than natural air circulation.
[6 figures, 14 references] FTP

3.63 MICROWAVE APPLICATIONS TO FREEZE DEHYDRATION. GASEOUS BREAKDOWN VS. ELECTRIC FIELD STRENGTH

Gould, James W., and Ernest M. Kenyon (Army Natick Labs, Food Lab., Natick, Mass.) Technical Rept. No. FL-119 USA-NLABS-TR-71-15-FL, 59 pp. (November 1970) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. AD-716-985, PC$3.00, microfiche 95¢. U.S. Government Research and Development Reports 71, No. 5, 40 (March 10, 1971)

Food freeze-drying cycles of 1/2 to 1/10 of the time required by conventional methods (radiant, conductive) appear feasible using microwave power. A major problem is corona breakdown, which occurs most readily under the pressure conditions of freeze-drying and causes deleterious effects on the food. The effects of pressure, temperature, frequency, gas composition, size and shape of cavity, electric field strength, and dielectric load are explained and interrelated in the region of interest of freeze-drying, using breakdown curves from the literature and derived by the authors. Experimental breakdown curves for air, water vapor, and carbon dioxide at 2450 MHz are presented and compared with theory.

Authors' abstract

3.61 EFFECT OF NEAR INFRARED ENERGY ON RATE OF FREEZE DRYING OF BEEF
2. SPECTRAL DISTRIBUTION

Burgheimer, F., M. P. Steinberg, and A. I. Nelson (Department of Food Science, University of Illinois, Urbana, Ill. 61801)
Journal of Food Science 36, No. 2, 273-276 (March 1971)

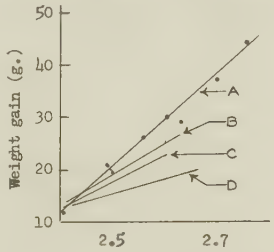
This is part 2 of a study to evaluate the use of near infrared radiation as the energy source for freeze drying of beef. The specific purpose of the research described in this article was to study the effect of spectral distribution of radiant energy in the near infrared region on the freeze drying rate and quality of 1-inch-thick slices of eye of the round beef. The authors wanted to find a waveband that is preferentially absorbed by the ice and water in the meat so that a high intensity can be applied without burning the surface.

Two approaches were used in applying the energy source. First, filters were interposed between the heaters and the meat to pass definite wavebands in the near infrared region; secondly, the voltage applied to the heaters was varied (at the same time the total radiating power was kept constant) to obtain different spectral distributions.

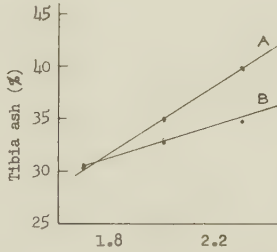
From the data obtained with the filters, the authors concluded that the short wavelengths, 1 μ or shorter, gave the most rapid drying. From the data obtained with voltage variation, they concluded that drying rate was improved by increasing the intensity and decreasing wavelength to about 0.95 μ. The shortest period achieved for complete drying of the beef samples using infrared heating was 7.0 hr. (the conventional method took 11 hr.). The quality of the dried meat samples produced by infrared radiation (at about 1 μ) was similar to that for samples produced by the conventional method of freeze drying.
[3 figures, 1 table, 6 references] FTP

6.190

content expected, the availability may vary little, or not at all, as feed consumption varies. (3) Availability should not be listed in general terms unless the biological nutrient content is near the total--or at least does not vary relative to different levels of the nutrient carrier. Meaningful studies of nutrient availability should include tests of the carrier; such tests should be made at several intake levels, and the results should be examined for possible drift as the intake level rises. [3 figures, 4 references]



Growth response of chicks fed diets supplemented with: A-lysine crystals B-lysine from soybean meal C-same as B but heated 2 hr. D-same as B but heated 3 hr.



Influence of intake level on availability of phosphorus from commercial sources A and B (both sources contain adequate vitamin D and a Ca:P ratio standardized at 2:1)

LB

6.131 HYDROSTATIC DRIVE OF TWIN SCREW PRESSES

Løvdal, T. H. (Sivilingeniør Fritjof Eitzen A/S, Lille Grensen 5, Oslo 1, Norway)
Norwegian Fishing and Maritime News 18, No. 1, 21, 23, 27 (1971)

The drive of twin-screw presses has the characteristic that input torque increases as the revolutions per minute of the screws decrease. As a result, the correct equipment for variable-speed control must be carefully selected. Electromechanical or hydrodynamical devices are commonly used for this purpose. But, to attain an adequately high torque at low speeds, it has been necessary to use quite large controls. The hydrostatic drives tested for the operation of presses used in the fishmeal industry give clear indication of a type of control that will regulate speed with greater accuracy, cost less, last longer, and require less maintenance than their electromechanical and hydrodynamical counterparts. The author describes these drives in detail. [3 figures] LB

6.137 OIL PURIFICATION

Japanese Patent 33770/70
Unilever N.V. (pat.)
Food Technology 25, No. 4, 134 (April 1971)

Free fatty acids are removed from glyceride oils at 105°-170° C., under pressure, and in contact with aqueous alkaline material. FTP

6.54 THE WHOLESOMENESS OF FISH PROTEIN CONCENTRATE: A NEW APPROACH TO THE EVALUATION OF FOOD SAFETY

Friedman, Leo, and Otto G. Glaser (Department of Nutrition and Food Science, Massachusetts Institute of Food Technology, Cambridge, Mass. 02139), Norman L. Brown, and E. R. Pariser (Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior, College Park, Md. 20740)
Toxicology and Applied Pharmacology 18, No. 2, 239-252 (February 1971)

Evaluation of the safety of foods is limited by the degree (level) to which they can be exaggerated in the diet of experimental animals without introducing nutritional complications. The authors suggest that this difficulty can be overcome by preparing extracts of the food and examining the toxicity of these extracts. They applied this approach to the evaluation of the safety of fish protein concentrate (FPC) using successive extraction with hexane, chloroform, ethanol, and water and feeding the extracts to rats and mice at levels equivalent to about 500% FPC in the diet. No toxic principles were found in the FPC. If the method is to be applied in a practical manner, a suitable extraction plant would be essential--the article gives a schematic diagram of such an extraction unit used for the experimental extraction of the FPC samples.
[2 figures, 9 tables, 35 references] FTP

6.54 THE ECONOMICS OF FISH PROTEIN CONCENTRATE

Devanney, J. W., III, and G. Mahnken
Report MITSG-71-3, 202 pp. (November 20, 1970) (Sea Grant Project Office, Massachusetts Institute of Technology, Cambridge, Mass.) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. PB-197 157, paper bound $3.00, microfiche 95¢.
Government Reports Announcements 71, No. 6, 38 (March 25, 1971)

The report examines the economic feasibility of fish protein concentrate in two contexts: as a nutritional supplement in the diet of a developing country, and as a competitive food additive in the United States. The report examines the subject with special reference to the role that the United States Government should play in the development of FPC. Fish protein concentrate designates any stable powder resulting from the removal of oil and water from fish which is aimed at human consumption. When we are referring to a particular variety of FPC, we will attempt to make this specialization clear either explicitly or by the context.
Reprinted

7.42 A SIMPLE, RAPID METHOD FOR DETERMINING TRACE MERCURY IN FISH VIA NEUTRON ACTIVATION ANALYSIS

Rottschafer, J. Mark (Department of Chemistry, University of Michigan, Ann Arbor, Mich. 48104), John D. Jones (Phoenix Memorial Laboratory, University of Michigan, Ann Arbor, Mich. 48105), and Harry B. Mark, Jr. (Department of Chemistry, University of Cincinnati, Cincinnati, Ohio 45221)
Environmental Science & Technology 5, No. 4, 336-338 (April 1971)

Described here are the application and the results of a modified version of a neutron activation analysis [H. J. M. Bowen and D. Gibbons, "Radio-Activation Analysis," Oxford at Clarendon Press (1963), pp. 264 and 5] for determining mercury in fish tissue. By this method, activated mercury, as an $HgCl_4^{2-}$ complex is separated on an ion-exchange resin and counted directly on the resin. Results of the analyses showed a ±10% standard deviation for fish tissue samples containing mercury in the range of from 0.05 to 10 p.p.m. The sensitivity of the method was limited to approximately 3 p.p.b.
[1 figure, 3 tables, 4 references] FTP

7.51 (3.331) A GREEN PIGMENT PRODUCED FROM TUNA METMYOGLOBIN

Koizumi, Chiaki, and Junsaku Nonaka (Tokyo University of Fisheries, Konan-4, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1258 (December 1970)

In 1968, the senior author reported that when tuna metmyoglobin is heated with trimethylamine oxide (TMAO) and cysteine under anaerobic conditions, it will produce a green precipitate closely resembling "green" tuna. The green pigment does not resemble either sulfmyoglobin or the choleheme or verdoheme compounds in the prosthetic group. In the present paper, he and his coauthor describe their method of obtaining, and the characteristics of, a green precipitate from tuna metmyoglobin, TMAO, and cysteine under aerobic conditions. Since the absorption spectra of the ester of the green pigment produced from tuna metmyoglobin, both in MeOH and in 5% HCl-MeOH, were almost identical with those of biliverdin dimethyl ester, they conclude that under the conditions of this experiment some of the prosthetic group of metmyoglobin will be converted either to biliverdin or to a closely related compound. The extent to which this pigment participates in the greening of tuna, however, remains unanswered.
[1 figure, 5 references] LB

7.0 FOOD

Foltz, Arthur K., James A. Yeransian, and Katherine G. Sloman (General Foods Technical Center, White Plains, N.Y. 10602)
Analytical Chemistry (Annual Reviews) 43, No. 5, 70R-100R (April 1971)

This review covers the advances in food analysis for the period from October 1968 to October 1970. The following items are considered: additives [91 references]; Adulteration, contamination, decomposition [159 references]; Carbohydrates [80 references]; Color [54 references]; Enzymes [36 references]; Fats, oils and fatty acids [152 references]; Flavor and volatile compounds [195 references]; Identity [86 references]; Inorganic constituents [98 references]; Moisture [19 references]; Organic acids [57 references]; Proteins, amino acids, and nitrogen [83 references]; Vitamins [30 references]; and Miscellaneous [36 references]. FTP

6.190 COMPARATIVE STUDIES FOR EVALUATING THE PROTEIN QUALITY (7.50) OF SELECTED FEEDS BY VARIOUS METHODS

Klaus, Brigitte, and Guenther Gebhardt (Sekt. Tierprod. Vet., Karl-Marx-Univ., Leipzig, Germany)
Chemical Abstracts 74, No. 7, 29560w (February 15, 1971)

6.54 USE OF KRILL FOR FOOD PROTEIN

Kryuchkova, N. I.
Trans. of Obtaining Food Protein from Krill, pub. in Rybnoe Khozyaistvo 46, No. 11, 53-56 (1970) (In Russian) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. JPRS-52169, PC$3.00, microfiche 95¢.
U.S. Government Research and Development Reports 71, No. 5, 40 (March 10, 1971)

Krill protein can be viewed as a highly valuable food product. The Okean protein paste obtained from krill in a frozen form can be used for preparing various dishes as well as in producing processed cheeses and other food products. The experiments conducted on sterilizing the protein paste and the freshly removed juice indicated that the sterilization temperature should not exceed 105C. At a temperature above 105C, the product turns dark and acquires an unpleasant aroma and taste. For food purposes it is possible to use fresh-caught krill kept on the deck for not more than 4 hours. The krill which has been on the deck for more than 4 hours since catching should be used for producing feed meal. The coagulation of protein from the krill juice is possible following two variations. The first provides for protein coagulation in a heat exchanger and then the removal of the produced protein from the broth by filtering or centrifuging. In following the second variation, the coagulation of the protein from the krill juice occurs directly in the cans in sterilization. Here the broth is not removed, and in this regard the output of finished products increases. Author's abstract

7.613 COLORIMETRIC DETERMINATION OF VITAMIN A WITH TRICHLOROACETIC ACID

Bayfield, R. F. (Veterinary Research Station, Department of Agriculture, Glenfield, New South Wales, 2167 Australia)
Analytical Biochemistry 39, No. 2, 282-287 (February 1971)

Results obtained for the determination of vitamin A in pure samples and in animal tissues using trichloroacetic acid as the chromogenic agent were similar to those obtained using $SbCl_3$. The trichloroacetic acid reagent is more convenient to use and is less toxic than the $SbCl_3$ reagent.
[2 figures, 3 tables, 10 references] FTP

7.8 EVALUATION OF CERTAIN PHYSICAL PROPERTIES OF MEAT USING A UNIVERSAL TESTING MACHINE

Stanley, D. W., G. P. Pearson, and V. E. Coxworth (Faculty of Food Sciences, University of Toronto, Toronto, Ontario, Canada)
Journal of Food Science 36, No. 2, 256-260 (March 1971)

An Instron universal tester (Instron Engineering Corporation, Canton, Mass.) was used to evaluate the physical properties of the uncooked meat of rabbit and beef. Measurements of the meat involved work of rupture, breaking strength, breaking elongation elasticity, and stress relaxation. The authors concluded that the instrument is capable of discerning variations in physical properties of uncooked muscle. They suggest the possibility that one or more of the tests may prove useful in predicting the tenderness of meat.
[3 figures, 4 tables, 26 references] FTP

7.461 (9.15)(9.19) (9.16) THE AUTOMATIC DETECTION OF LOW LEVELS OF DISSOLVED FREE CHLORINE IN FISH FARMING EXPERIMENTS USING SEAWATER EFFLUENTS

Page-Jones, R. M. (White Fish Authority, Marine Fish Cultivation Unit, Hunterston, Ayrshire, Scotland)
Progressive Fish-Culturist 33, No. 2, 99-102 (April 1971)

If fish or other livestock are to be reared in the effluent of seawater-cooled power stations, it is essential to ensure that chlorine, injected at the input to the cooling system to reduce fouling by marine organisms, does not build up in the cultivation tanks to any appreciable level. Since dissolved chlorine tends to disappear from natural causes if the effluent is held in an open tank for some time, the amount of dissolved chlorine in the tanks will be negligible unless the chlorine level in the effluent supply is abnormally high for a period of some hours. With this in mind, it was decided to construct an automatic instrument which would give a clear indication of the level of dissolved chlorine in the form of green, amber, and red lights, representing low, high, and alarm levels.

This paper outlines the method used in an experimental dissolved free chlorine detector that has been in operation about a year.
[2 figures]

Reprinted in part

8.50 (1.953)(0.6) CHEMICAL COMPOSITION OF THE EXTRACTS OF WHALE MEAT AND ITS CHANGE DURING CONDENSATION

Suyama, Michizo, Michie Maruyama, and Seiichi Takeuchi (Tokyo University of Fisheries, Konan, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1250-1257 (December 1970)

The constituents of meat extracts are of considerable significance as intermediate metabolites and because of their biological activity and their potential use as a source of condiments. The authors have published two reports (1967 and 1970) describing a technique for determining the amounts of imidazole peptides in whale meat extracts. The technique permits precise analysis of the changes that may occur in the amount of each constituent during commercial condensation of the extract. In the present study, they determine the composition of meat extracts prepared under conditions designed to minimize chemical change (henceforth called "fresh extracts") and compare it with that of condensed extracts. They used the dorsal meat of sei whale, Balaenoptera borealis, that had been frozen and stored at -30° C. They also report a method they devised for determining the amount of Maillard-type pigments in the extracts.

Proximate composition of sei whale meat and condensed meat extracts

Constituent	Amount in: Meat	Extract
	percent	
Moisture	74.2	35.8
Total N	3.77	9.30
Crude ash	0.94	10.4
Crude fat	1.85	0.143
Carbohydrates	0.84	3.33

The yield of extract from the meat was 3.97% on a moisture-free basis--more than that reported for ox meat by Bender et al. (1958). More than 97.5% of the

(over)

8.51 (1.84) AMINO ACID COMPOSITION AND PHOSPHOROUS CONTENT IN THE EXTRACTS OF SCALLOP ADDUCTOR MUSCLE

Oishi, Keiichi, and Atsushi Iida (Laboratory of Seafood Chemistry, Faculty of Fisheries, Hokkaido University, Hakodate, Japan), and Ayako Yoshimura (Osaka Shoin Women's College, Higashi-Osaka)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1226-1230 (December 1970) (In Japanese; summary and tables in English)

The adductor of scallops (Pecten yessoensis) consists of both striated and smooth muscle. The former is slightly reddish and not only more palatable than the smooth muscle but almost nine times its size. The smooth muscle is whitish. Both types of muscle, along with samples of body juice, were analyzed for amino-acid composition and for organic and inorganic phosphorus content.

The amount of amino nitrogen and the ratio of amino nitrogen to total nitrogen in the two types of muscle were not significantly different. Glycine constituted about 50% of the total amino acids in all the samples examined; taurine, between 23 and 42%. The striated muscle contained the highest concentration of phosphorus; the body juice the lowest. Except for glycine, taurine, glutamic acid, and alanine content, the content of arginine in both muscles was higher than that of any other amino acid. The authors therefore assume that arginine phosphate is a source of energy for the scallop.

[5 tables, 9 references] LB

8.51 (1.953) COMPARISON OF COLLAGENS FROM DIFFERENT TISSUES OF SPERM WHALE

Kubota, Minoru, Naoyuki Uchida, and Shigeru Kimura (Tokyo University of Fisheries, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1242-1245 (December 1970)

In a previous paper, the authors reported that pepsin-treated, neutral-salt-soluble collagen from the nose cartilage of sperm whale contained high concentrations of hydroxylysine and amide nitrogen as well as some glucuronic acid. To investigate whether these unusual properties are characteristic of all sperm-whale collagen, they examined the chemical composition and some of the physical properties of three other collagens from this whale: those from the skin, the head-oil sac, and the tendinous septa. Some of the findings are tabulated below.

Collagen source	Amino-acid composition: Hylys	($-NH_2$)	Hypro	Tyr	Carbohydrate content: Hexose	Hexosamine	Physical properties: Coef. of visc.	Denatur. temp.	Spec. rot.
	residues/1,000 total res.				percent		dl/g.	°C.	deg.
Nose cartilage	25.3	102	86.5	1.2	3.0	1.3	13.3	30.2	-439
Skin	9.1	48.0	77.1	2.5	0.8	0.3	19.6	31.7	-434
Head-oil sac	11.0	50.8	81.9	2.8	0.3	0.1	18.0	33.4	-420
Tendinous septa	12.4	56.7	84.0	2.1	0.3	0.2	20.0	33.8	-390

(over)

9.12 (9.16) FASTER-GROWING FISH FOR MARINE FARMS

Anonymous
Fishing News No. 3015, 9-10 (April 2, 1971)

Recent research by Colin Purdom of the Lowestoft Fisheries Research Laboratory has led to the development of gynogenetic fish--that is, fish with chromosomes from only one parent. The technique involves fertilizing the egg with sperm that is genetically inert (made so by radiation) and then subjecting the fertilized egg to cold shock by immersing it in sea water at 0° C. The result is a diploid fish--that is, a fish with two sets of chromosomes inherited from the mother and none from the father. With a modification of the technique, the sperm is not irradiated and the egg is subjected to a 4-hr. cold bath about 15 min. after it is fertilized. Interruption of the final maturation division prevents the two groups of chromosomes from splitting and results in a triploid fish--that is, a fish having two sets of chromosomes from the mother and one from the father. By applying an accurately timed cold shock during the first cell division of the embryo, Purdom expects to produce tetraploids.

Diploid fish can be inbred easier and faster than normal fish. Triploids have additional advantages: their body cells are bigger, so the fish are bigger; since they have more genetic material, they will grow 20% faster than even the diploids; and since they are sterile, their growth rate is not slowed down by sexual maturity, nor would discrepancies in size between males and females occur, a characteristic disliked by farmer and processor alike; they would reach marketable size in a year, avoiding the expensive overlapping of fish tank usage. Almost any fish so far reared in captivity (except salmon and trout) can be made triploid.

[1 photograph] LB

8.51 (1.953)

No glucuronic acid was found in any of the three collagens tested for this report. The authors attribute any differences in chemical composition to the specific function of the tissue.
[1 figure, 3 tables, 19 references]

LB

8.50 BIOCHEMISTRY OF OCEAN PLANKTON. CHEMICAL COMPOSITION OF PLANKTON FROM DIFFERENT DEPTHS OF THE NORTHWESTERN PACIFIC OCEAN

Vinogradov, M. E., O. K. Bordovskii, E. A. Akhmet'eva (Inst. Okeanol. im. Shirshova, Moscow, U.S.S.R.)
Chemical Abstracts 74, No. 11, 49866d (March 15, 1971)

8.50 (1.953)(0.6)

dried matter and nitrogen was accounted for in the fresh extracts and almost 99.3% was accounted for in the condensed extracts. The most notable differences in the composition of the two types of extract are shown in the table below.

Composition of meat extracts of sei whale, a summary

Constituent	Fresh extracts		Condensed extracts
	percent	percent N	percent
Amino acids	1.71	1.47	1.27
Imidazole peptides	49.0	64.9	35.5
Other peptides	15.2	1.38	1.17
Creatine and creatinine	8.38	17.7	7.97
Urea	17.0	4.47	0.76
Ammonia	0.25	1.17	0.32
Nucleotides	6.67	6.21	4.24
Organic acids	0.92		17.4
Free sugars	0.19		0
Crude fat	--		0.22
Inorganic matter	19.1		16.2
Pigments	0		14.1

Notes:

(1) The figure for total yield of the extracts (3.97%), which was obtained on a moisture-free basis, was used to convert the fresh meat data.

(2) Pigmentation was estimated by use of a column of acidic cation-exchange resin.

[4 tables, 28 references]

LB

9.12 VISION AND NEAR ORIENTATION OF FISH

Protasov, V. R.
Trans. of mono. Zrenie i Blizhnyaya Orientatsiya Ryb., Moscow, 205 pp. (1968) by M. Raveh
Report SFCSI-Int(TT-70-50065), 180 pp. (1970) Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. TT-70-50065, PC$3.00, microfiche 95¢.
U.S. Government Research and Development Reports 71, No. 4, 34 (February 25, 1971)

The role of vision and optical signals in fish behavior has been clarified by various methods. Abstract reprinted in part

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9.125 POLYMORPHISM OF MALATE DEHYDROGENASE AND GENETIC STRUCTURE OF JUVENILE POPULATION IN SAURY COLOLABIS SAIRA

Numachi, Ken-ich (Ocean Research Institute, University of Tokyo, Nakano, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1235-1241 (December 1970)

Progress in the study of fish populations has been handicapped by the dearth of genetic markers. Most characters are too complex to permit genotypes being determined from phenotypes, for the latter involve many genes along with other complex factors, including the complexities arising from dominance and epistasis. Now, however, genetically determined variants that reveal genotype have been found in various proteins and enzymes. In this report, the author demonstrates that malate dehydrogenase can be used to characterize two populations of saury.
[4 figures, 1 table, 8 references]

LB

8.51 (1.953)(1.7) ON THE SUBUNITS OF WHALE COLLAGENS

Kubota, Minoru, Naoyuki Uchida, and Shigeru Kimura (Tokyo University of Fisheries, Minato-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1246-1249 (December 1970) (In Japanese; figures, table, and summary in English)

The denatured proteins of neutral-salt-soluble collagen from the nose cartilage of sperm whale and those of pepsin-soluble collagen from the whale's skin were separated into subunits by CM-cellulose column chromatography, and each was examined by disk electrophoresis. The acid-soluble collagen from the skin of the great blue shark was treated in like manner, and the results were compared with those obtained from the whale collagens.

Collagen from the shark's skin consisted of α, α_2, β_{11}, β_{22} and γ components; that from whale skin consisted of α_1, α_2, α_3, β_{22}, γ, and an unidentified β component, possibly β_{11}, β_{13}, or β_{33}. As a whole, the chromatograms of the two skin collagens were quite similar; however, those of nose cartilage collagen differed appreciably--the protein peaks appeared quite fast and major parts of the collagen were not adsorbed on the CM-cellulose. Using a linear gradient between 0.01 and 0.11 ionic strength and acetate buffers at pH 4.8, the authors isolated four kinds of α and one of β from the nose cartilage. The fast peak of the α component accounted for about one-third of the total protein. It contained 9.0% hydroxyproline, 0.6% tyrosine, 0.6% hexosamine, 1.6% hexose, and 2.3% glucuronic acid. (The neutral-salt-soluble collagen from the nose cartilage contained, respectively, 7.3, 1.2, 2.9, and 2.1%.) The authors suggest that this unusual pattern may be due to the noncollagenous material (such as glucuronic acid) that is contained in the collagen molecule. [3 figures, 1 table, 6 references]

LB

9.125 LIFE WITH JELLYFISHES

Anonymous
Nature 229, No. 5287, 598 (February 26, 1971)

Many young stromateoids are known to associate intimately with jellyfishes and siphonophores, swimming actively but carefully among the toxin-laden appendages. Michael H. Horn reported in Breviora, No. 359, 1 (1970) that the swim bladders of 14 out of the 15 recognized genera of stromateoid fishes regress with age, diminishing gradually until the sac is completely resorbed. Pampus is the exception; it apparently has no swim bladder at any age and semmingly does not associate with jellyfish. In contrast, Nomeus gronovii associates intimately and for a long period of its life with the siphonophore Physalia; in addition, it retains a functional swim bladder for a longer time than any of the other stromateoids. Even when they are small, these swim bladders provide the fish with a degree of buoyancy. The skeleton of juvenile stromateoids is poorly ossified and their musculature only partly developed; hence even a small swim bladder will give them more or less neutral buoyancy. The ability to stay afloat efficiently and maneuver with nicety is obviously a great advantage to small stromateoids in their critically confined habitat. LB

9.13 CHOLESTEROL AND HYPERBARIC OXYGEN IN SWIMBLADDERS OF DEEP SEA FISHES

Phleger, C. F., and A. A. Benson (Scripps Institution of Oceanography, University of California, San Diego, La Jolla, Calif. 92307)
Nature 230, No. 5289, 122 (March 12, 1971)

The swim bladder of shallow-water fish is lined with a thin layer of fat. In contrast, that of deep-sea fish is almost filled with this fatty lining. The principal lipids found in three species of the latter fish (flatnose codling, Antimora rostrata; rattail, C. abyssorum; and Pacific rattail, Coryphaenoides acrolepis, caught at 730, 1,830, and 3,800 m.) were cholesterol (up to 49% on a dry weight basis) and phospholipids, the ratio being about 1:1, 1:2.5, and 1:1, respectively. The lipids included large amounts of unsaturated fatty acids, the free fatty acid fraction ranging from 64 to 82% and increasing with depth. (The unsaturation of the phospholipid fatty acids did not increase with depth.) Major amounts of 16:1 and 18:1--and appreciable amounts of 22:6--fatty acids were present. From these findings, the authors conclude that (1) oxygen or pressure (the swim bladders contained up to 90% oxygen at pressures as high as 380 atm.) may influence the formation of cholesterol in swim bladders and (2) these lipids may relate to some method of buoyancy control--the solubility of oxygen in the lipid compounds may affect their densities or facilitate the secretion of gas at high pressure. [1 table, 7 references] LB

9.14 (1.30) THE ABERNATHY SALMON DIET

Fowler, Laurie G., and Roger E. Burrows (Bureau of Sport Fisheries and Wildlife, Salmon-Cultural Laboratory, Longview, Wash. 98632)
Progressive Fish-Culturist 33, No. 2, 67-75 (April 1971)

One of the continuing programs of the Salmon-Cultural Laboratory has been the development of nutritionally adequate yet economically feasible diets suitable for the artificial propagation of salmon (Oncorhynchus). This work was started during the 1940's with chinook (O. tshawytscha) and sockeye (O. nerka) salmon fingerlings.

From these years of research, we have now developed a meal-oil, dry diet that is superior to any of our previous formulations. The diet is a simple, open formula and, depending upon particle size, can be fed to fish from time of first feeding to time of release. For the past 2 years the diet has been tested at the Salmon-Cultural Laboratory on fall chinook salmon with excellent results. It has been fed on a production basis at the Quinalt National Fish Hatchery to both fall chinook and coho salmon (O. kisutch) from swim-up until time of release; and it is being fed at several other National Fish Hatcheries to fall and spring chinook salmon, coho salmon, steelhead trout (Salmo gairdneri), and Atlantic salmon (S. salar).

The objective of this paper is to review some of our experiments in the development of this diet and to present the current formulation of the Abernathy dry diet. The methods of preparing the diet, along with recommended feeding techniques, will also be discussed.
[4 tables, 24 references] Reprinted in part

9.15 (1.9) TOXICITY OF CERTAIN CHEMICALS TO JUVENILE POMPANO

Birdsong, Charles L., and James W. Avault, Jr. (School of Forestry and Wildlife Management, Louisiana State University, Baton Rouge, La. 70803)
Progressive Fish-Culturist 33, No. 2, 76-80 (April 1971)

Pond culture of the pompano (Trachinotus carolinus) has received much attention in recent years. An important consideration in culturing the pompano is parasite and disease control. Efficient use of chemicals for treatments requires a knowledge of the toxicity to fish and of the effect of water quality upon the toxicity. The purpose of this study was to determine the toxicity of several therapeutic chemicals to juvenile pompano, and to determine the effect of salinity on this toxicity.

Pompano were more resistant to acriflavin, copper sulfate, and formalin than many freshwater fish, but were more susceptible to potassium permanganate. From these tests it appears that pompano can be treated sucessfully with many of the same chemicals used in freshwater pond culture--with the possible exception of potassium permanganate. [3 tables, 10 references] Reprinted in part

9.13 (0.4)(9.15) (0.39) SEKOKE DISEASE, SPONTANEOUS DIABETES IN CARP FOUND IN FISH FARMS

Yokote, Motoyoshi (Freshwater Fisheries Research Laboratory, Hino-Shi, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 36, No. 12, 1214-1223 (December 1970)

II. SOME METABOLIC ASPECTS, pp. 1214-1218.

In the first part of this investigation, the author found that the microscopic characteristics of Sekoke-affected carp were similar to those of diabetic mammals. In the present part, he confirmed that the symptoms exhibited by carp affected by Sekoke disease are similar to those exhibited by mammals suffering from diabetes mellitus: hyperglycemia, decreased glucose tolerance, glycosuria, and acidosis. The delayed response, higher peak, and tardy fall shown in the carp's glucose-tolerance curve, in particular, are quite similar to the mode of change in the curve for diabetic man. [2 figures, 2 tables, 24 references]

III. RESPONSE TO MAMMALIAN INSULIN, pp. 1219-1223.

In recent research on diabetes, great importance has been placed on pancreatic and serum insulin activity and the response of animals or their tissues to exogenous insulin. In this part of the investigation, the author examined the effects of mammalian insulin on the glycemic levels in normal and Sekoke-affected carp. He found that normal carp exhibited a marked hypoglycemia following intramuscular administration of 10 IU/kg body weight of mammalian insulin, whereas Sekoke-affected carp exhibited significant insulin resistance to the same dosage. [2 figures, 1 table, 22 references] LB

9.125 DIFFERENTIAL LEUKOCYTE COUNTS AND TOTAL LEUKOCYTE AND ERYTHROCYTE COUNTS FOR SOME NORMAL ISRAELI MIRROR CARP

Hines, R., and A. Yashouv (Fish Culture Research Station, Dor, Israel)
Bamidgeh 22, No. 4, 106-113 (December 1970)

Total and differential leukocyte counts are indices which have found application in many branches of veterinary diagnostics. There is reason to believe that these indices will also be of value in assessing conditions of health and disease in fish.

Using the terminology recently developed for fish blood cells by Jakowska (1956) and Weinreb (1963), we have compiled a blood cellular picture for some healthy mirror carp (Crypinus carpio) from the Dor Experimental fish ponds. [8 figures, 1 table, 17 references] Reprinted in part

9.16 (9.15)(9.17) CONTROL OF OYSTER DRILLS, EUPLEURA CAUDATA AND UROSALPINX CINEREA, WITH THE CHEMICAL POLYSTREAM

MacKenzie, Clyde L., Jr. (Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn. 06460)
Fishery Bulletin 68, No. 2, 285-297 (February 1971)

Five experimental and 10 commercial treatments of oyster beds in four States were made with Polystream [trademark for a mixture of polychlorinated benzene containing a minimum of 95% total of active trichlorobenzene, tetrachlorobenzene, and pentachlorobenzene]. On a typical bed, where water currents were less than 2.7 km. per hour, Polystream killed about 85 percent of the thick-lipped drill, Eupleura caudata, and 66 percent of the Atlantic oyster drill, Urosalpinx cinerea. A significantly higher percentage of oyster drills was killed by treatments made in late April and early May rather than later in the summer. Oyster drills that survived did not feed for several months. The number of drills remained low for at least 2 years. Polystream treatments killed only small percentages of fish, small clams, Mercenaria mercenaria, crabs, and other invertebrates. After a treatment, oysters, Crassostrea virginica, clams, and other organisms had small residues of Polystream in their tissues but gradually lost these residues. Growth of oysters was normal on treated beds.
[2 figures, 5 tables, 7 references] Author's abstract

9.14 (3.14) FEED FOR ANIMALS

Murakami, Masuo, Takuo Sawata, Hiroshi Suzuki, and Kazuharu Tamazawa (Yamanouchi Pharmaceutical Co., Ltd.) (pat.)
Japanese Patent 18931/70
Chemical Abstracts 74, No. 11, 52307c (March 15, 1971)

9.15 (9.13)(1.37) (1.92) EFFECTS OF ANTIMYCIN A ON TISSUE RESPIRATION OF RAINBOW TROUT AND CHANNEL CATFISH

Schoettger, Richard A., and Gerald E. Svendsen (Fish Contr. Lab., Bur. of Sport Fish. and Wildlife, La Crosse, Wis.)
Chemical Abstracts 74, No. 9, 39841c (March 1, 1971)

9.14 PROPAGATION OF CHIRONOMID LARVA AS FOOD FOR FISH FRY

Yashouv, A. (Fish Culture Research Station, Dor, Israel)
Bamidgeh 22, No. 4, 101-105 (December 1970)

There are three important requirements to be kept in mind for successful culture of chironomid larvae for use as fish fry food: (1) selection of the proper chironomid species using decaying organic matter as an oviposition attractant; (2) continuous provision of proper food (in our case, the supply of organic matter, such as chicken manure or fish meal) to fulfill the maintenance demand and growth requirements of a high larval population; (3) a continuous water flow through the culture tanks to reduce the effects of over-crowding and the operation of density dependent factors.
[3 figures, 9 references] Reprinted in part

9.13 (8.59) INFLUENCE OF TEMPERATURE CHANGES ON ENZYMES OF THE FISH MUSCLE. EXPERIMENTS WITH RHODEUS AMARUS

Braun, K., H. Kuennemann, and H. Laudien (Zool. Inst., Univ. Kiel, Kiel, Germany)
Chemical Abstracts 74, No. 7, 29423d (February 15, 1971)

9.16 (1.92) INITIAL RESULTS OF SILVER CARP (HYPOPHTHALMICHTHYS MOLITRIX) BREEDING IN ISRAELI FISHPONDS IN 1969

Sarig, S. (Laboratory for Research of Fish Diseases, Nir David, Israel)
Bamidgeh 22, No. 4, 95-100 (December 1970)

1. It is possible to nurse silver carp fingerlings to a stocking size of 10 g and over within 35-50 days in nursery ponds at a density of 30,000-40,000 fingerlings/ha. In these nursery ponds, silver carp obtained a daily total increment of 10 kg/ha, in addition to the yield of about 1000 carps growing with them.

2. Best commercial results in fattening ponds were obtained when 10-20 g silver carp fingerlings were stocked at a density of 500-1000 fish/ha.

3. At densities above 1500 fish/ha, the individual growth rate of the silver carp was reduced by at least 50%. The total daily increment per ha at the high density was equal to that obtained at a density of 500 fish/ha, and fish did not reach market size.

4. The high population density of 1500 fish/ha might be suited to intensive nursery stocking in fall for stocking fattening ponds in early spring, or for growing in winter and early spring for marketing in spring and early summer.

[5 tables, 1 reference] Author's summary

9.17 (9.19) FOOD FOR FISH FROM RED MANGROVES

Anonymous
South Florida's Mangrove-bordered Estuaries, Their Role in Sport and Commercial Fish Production
Sea Grant Information Bulletin No. 4, 28 pp. (December 1970) Available from Sea Grant Advisory Services, 10 Rickenbacker Causeway, Miami, Fla. 33149. $1.00
Fishing News International 10, No. 3, 84 (March 1971)

The 700 square miles of mangroves bordering the shallows of southern Florida contribute more than 3 tons (dry weight) of detritus an acre a year to the fish and shellfish food chain. When the dead leaves fall into the water, they contain about 6% protein. But by the time they have been there a year, the bacteria and fungi that use them as host have increased the protein value to as much as 22%. These detritus consumers, in turn, become the food of more than 60 species of juvenile fishes, many of which spend long periods of their lives in the estuaries; others inhabit the coastal waters into which some 50% of the detritus is transported. These small marine animals are then eaten by the larger ones. In 1968, for example, commercial landings of species linked to the mangrove food chain were worth almost $18,000,000 (32,000,000 lb. of shrimp, worth $15,700,000; 15,000,000 lb. of blue crab, worth $1,200,000; and 3,700,000 lb. of spotted seatrout, worth $1,000,000).

With so many species dependent on mangrove detritus as a source of nutrition, pollution of the estuaries is of growing concern. Pesticide residues adsorbed on the surface of detritus may be concentrated by the microorganisms living on the leaf particles. Crude oil introduced into the water may form around the particles

(over)

9.19 (9.3) MARINE POLLUTION PROBLEMS AND REMEDIES

Schachter, Oscar, and Daniel Serwer (United Nations Institute for Training and Research)
American Journal of International Law 65, No. 1, 84-111 (January 1971)

The present international system, based on the interdependency of sovereign states, has both considerable capacity and serious limitations for dealing with marine pollution problems. The authors illustrate such capacities by discussing the specifics of current marine pollution problems. They select some of the most important problems and summarize what is known about where the pollutants originate, the extent to which the pollutants exist in the marine environment, how the pollutants affect the marine environment, what controls now apply, and the prospects for future pollution and control. This information is considered under four groups: oil, chlorinated hydrocarbons, wastes discharged from coasts, and wastes discharged from vessels. Some basic facts about the marine environment are included.

A many-sided institutional approach is needed to achieve the right balance in resolving pollution problems. The problems will not be solved by a single discipline, by a single institution, or by a single wave of enthusiasm. Although there is need for new institutions, a large part of the solution will lie in making old institutions more effective.

[83 footnotes] FTP

9.19 USE OF STABLE ELEMENT DISTRIBUTION PATTERNS FOR PREDICTING DISTRIBUTION OF RADIONUCLIDES IN MARINE ORGANISMS

Ting, Robert Y. (Puerto Rico Nuclear Center, Mayaguez, Puerto Rico)
Bioscience 19, 1082-1085 (December 1969)
Nuclear Science Abstracts 25, No. 5, 826 (March 15, 1971)

Nuclear explosives, used for excavating an Atlantic-Pacific sea-level canal, would introduce radionuclides into terrestrial and aquatic environments. For predicting hazards from radioactive fallout and contamination in marine and estuarine environments the specific activity approach was used. The concentrations of several biologically important stable elements (Zn, Fe, Mn, Ca, Sr, Sc, C, H, and N) were determined in fish and invertebrates from Panamanian and Colombian waters. These measurements, in conjunction with the specific activity predictions, were then used to predict the amounts of radionuclides that would be present in food items. The amounts of ^{32}P, ^{45}Ca, ^{46}Sc, ^{54}Mn, ^{55}Fe, ^{59}Fe, ^{65}Zn, and ^{89}Sr, predicted for 250 g of different marine foods, were compared with the daily intake allowed in members of the general population in which it is possible to identify the population group expected to receive the highest dose. In general, food of marine origin in areas contaminated by fallout would provide smaller amounts of radionuclides per unit weight than would most foods of terrestrial origin harvested from areas of equal contamination. In areas of fallout, the accumulation of radionuclides from surface contamination of the individuals, and the items they handle or contact, would be expected to be greater than the accumulation of radionuclides from marine foods. (auth.) Reprinted

9.17 (9.19)

and prevent the microorganisms from colonizing there. And some chemicals could even kill the microorganisms. Thermal pollution could result in undesirably low levels of dissolved oxygen in areas where the rate of water exchange is low. The importance of maintaining these estuaries and coastal marshes in their natural state cannot be overemphasized, for they serve as havens and nurseries for over half the fish and shellfish harvested in the United States. LB

9.17 THE AREA OF ORIGIN AND A COLUMBIA RIVER DIVERSION

Johnson, Ralph W. (University of Washington)
Washington Law Review 46, No. 2, 245-281 (January 1971)

In 1968, the United States Congress declared a 10-year moratorium on any study of the diversion of Columbia River water to the Southwest. One reason was to give residents of the Pacific Northwest time to analyze their region's water needs to determine if "surplus" water was available for export, and to establish a regional policy towards diversion proposals. In this article, the author assumes a neutral stance towards the ultimate issue of diversion and attempts only to analyze the problem of protecting the area of origin in the event of a Columbia River to Southwest interbasin water transfer.
[128 footnotes] FTP

9.17 (9.19) WATER -- 1971

Cecil, Lawrence K. (editor)
Chemical Engineering Progress Series 67, No. 107, 1-610 (1971) (Published by the American Institute of Chemical Engineers, 345 East 47th Street, New York, N.Y. 10017)

This publication contains most of the papers (91 papers) presented at the Institute's meeting during 1970 and deals with the rapid progress made in the control of the water environment. FTP

9.19 OIL SLICK SPRAY

Anonymous
Commercial Fishing 10, No. 1, 9 (January 1971)

A new method of cleaning oil slicks from the surface of the sea involves (1) aromatic solvents sprayed from 15-ft.-long booms on each side of a tug or small fishing vessel, (2) a diesel-powered pump that propels the solvent at low pressure, and (3) surface-breaking battens that are towed behind the ship. The complete spraying kit can be assembled without special tools or it can be machined from available plans; the equipment can be easily installed at sea. With the booms attached at right angles to the ship, a 60-ft. wide path of oil can be converted to dispersible emulsion on each run of the vessel.
[1 photograph] LB

9.17 EFFECTS OF GRAVEL CLEANING ON BOTTOM ORGANISMS IN THREE SOUTHEAST ALASKA STREAMS

Meehan, William R. (Forest Service, U.S. Department of Agriculture, Pacific Northwest Forest and Range Experiment Station, Juneau, Alaska 99801)
Progressive Fish-Culturist 33, No. 2, 107-111 (April 1971)

Excessive sediment in the spawning gravels of salmon streams is believed to be one of the factors limiting salmon production. Natural as well as man-caused sedimentation is of concern. With the goal of improving the salmon spawning habitat in the streams of Alaska's National Forests, the Forest Service has been instrumental in the development of a machine for "cleaning" streambed gravels. The riffle sifter, as it is called, is a self-powered amphibious vehicle that stirs up the streambed gravel and then sucks up the fine materials and sprays them out onto the streambanks.

The effect of this gravel-cleaning work on populations of stream bottom fauna was not known. Although of no great importance to pink and chum salmon (Oncorhynchus gorbuscha and O. keta), whose young do not feed extensively in fresh water before they migrate seaward, stream bottom organisms are an important source of food for the young of coho salmon (O. kisutch) and the various trouts and chars (Salmo spp. and Salvelinus spp.) which spend from one to several years in fresh water.

The objective of this study was to evaluate some of the effects of the riffle sifter on populations of bottom fauna in some typical salmon streams in southeastern Alaska.

To summarize, the cleaning of gravel in three streams initially reduced the bottom fauna populations in each of these streams, but within 1 year these populations apparently returned to the pretreatment levels in each of the streams.
[2 figures, 2 tables] Reprinted in part

9.19 SURVIVAL AND HATCHING OF WALLEYE EGGS AT VARIOUS DISSOLVED OXYGEN LEVELS

Oseid, Donavon M., and Lloyd L. Smith, Jr. (Department of Entomology, Fisheries, and Wildlife, University of Minnesota, St. Paul, Minn. 55101)
Progressive Fish-Culturist 33, No. 2, 81-85 (April 1971)

Oxygen has been studied extensively as an environmental factor related to the survival of fish and to the action of toxic wastes on life-history stages. Most of the available information relates to juvenile fish or adults, but there have been significant publications on salmonid and northern pike eggs, and some on walleye eggs and fry.

The present study was made to examine the effect of various non-lethal levels of oxygen on the survival, rate of hatch, and size of fry at the hatch of walleye, Stizostedion vitreum vitreum (Mitchill), eggs.

It is apparent from the reaction of walleye eggs to incubation at different oxygen levels that hatching time is substantially extended and mean length is smaller at lower levels. When length of the hatching period is extended by the subjection of eggs to low temperatures, the differences in length at different oxygen levels become greater. The differences in survival rates at different oxygen levels are also greater when temperatures during the incubation period are lower.

The ecological significance of hatching after a longer time and at a shorter length in low oxygen concentrations can only be surmised from the available data. If shorter incubation periods and larger size at hatching time are considered to be advantageous to placing larger year classes in a natural system, optimum oxygen levels for the incubation of walleye eggs appear to be not lower than 5 to 6 p.p.m. [2 figures, 3 tables, 4 references] Reprinted in part

9.19 STUDIES OF THE NATURAL ALPHA-EMITTING RADIOISOTOPES IN MARINE ORGANISMS

Beasley, Thomas M. (Lab. of Radiation Ecology, Univ. of Washington, Seattle, Wash.)
Annual Progress Report, 1970-1971, 46 pp. (Dec. 10, 1970) Contract AT(45-1)-2225.
Available from the National Technical Information Service, Operations Division, Springfield, Va. 22151. Order No. (RLO-2225-T-14-1)
Nuclear Science Abstracts 25, No. 6, 1057 (March 31, 1971)

Sample collections were made of zooplankton (copepods, euphausiids, mysids, and zoea), pelagic fishes (smelt, rock fish, herring, cod, whiting, and sablefish), and benthic organisms (sole, flounder, hake, sea urchins, sea cucumbers, and crabs). Tissues from these specimens were analyzed for ^{210}Po, ^{210}Pb, and stable lead. An increase in ^{210}Po concentrations from copepods to euphausiids and from mysids to pelagic fishes occurred. In contrast, ^{210}Pb levels decreased through the same chain. A higher concentration of radionuclides was found in the internal organs than in the muscles. Reduced concentrations of ^{210}Po were found in the late spring and summer months. Radiometric and trace element measurements were made on protein concentrates prepared from pelagic fishes collected both offshore and from estuaries and lakes. Sutdies on analysis of blood specimens from residents of Rongelap Atoll revealed unusually high body burdens of ^{55}Fe. Reprinted

9.3 (9.4) LAW OF THE SEA ISSUE

JAG Journal 25, No. 3, 67-100 (December 1970-January 1971)

"Introduction to the 1971 Issue on Law of the Sea," by John R. Brock (Office of the Judge Advocate General of the Navy), pp. 67, 68.

The articles presented in this issue are dedicated to increasing the general understanding of recent legal developments relative to the law of the sea.

"Territorial Sea Agreement -- Key to Progress in the Law of the Sea," by William R. Palmer (Law of the Sea Branch, International Law Division, Office of the Judge Advocate General), pp. 69-78.

Although the concept of the territorial sea is recognized in international law, the world community has failed to reach agreement on the breadth of the territorial sea. The author traces the history of the question on the breadth of the territorial sea and points out the urgent need to resolve it at the new law of the sea conference. In conclusion, he states that although the breadth of the territorial sea is only one of several problems that should be considered by the conference, resolution of this problem is most pressing and could lead to expeditious settlement of other issues. [64 footnotes]

"The New Quest for Atlantis: Proposed Regimes for Seabed Resources," by W. Frank Newton (Law of the Sea Counsel, International Law Division, Office of the Judge Advocate General), pp. 79-92.

(over)

9.3 (9.7) QUANTITATIVE CONTENT ANALYSIS OF THE UNITED NATIONS SEABED DEBATE: METHODOLOGY AND A CONTINENTAL SHELF CASE STUDY

Friedheim, R. L., and J. B. Kadane (Center for Naval Analyses, Arlington, Va.) with the assistance of J. K. Gamble, Jr. (Doctoral candidate in political science, University of Washington, Seattle, Wash.)
International Organization 24, No. 3, 479-502 (Summer 1970)

The authors state that the United Nations seabed debates are the most comprehensive single body of data available on the attitudes of states on the problems of managing the uses of the ocean. They are the only available body of data through which an overview can be obtained of the patterns of state opinions on ocean questions. As such, the authors state, they should be useful in trying to illuminate the possible outcomes of the debate. They developed an appropriate method for analysis of the seabed debates--the technique is a particular application of quantitative thematic content analysis [Ole R. Holsti, "Content Analysis for the Social Sciences and Humanities," Addison-Wesley Publishing Co., Reading, Mass. (1969), pp. 5-7, 122-124]. This article is a discussion of the nature and problems of the method and its application to the UN seabed debates, a case study illustrating some of the results of the application of the method, and a statement of the authors' future research plans in this regard. This study should be of interest to scholars of the UN.
[5 figures, 3 tables, 19 footnotes] FTP

9.3 (9.2) CONSUMER PROTECTION

San Diego Law Review 8, No. 1, 1-91 (January 1970)

This issue, devoted to "Consumer Protection" contains nine articles on the subject:

"Action for Consumers," by Hubert H. Humphrey, pp. 1-3.
"The Department of Transportation and the Consumer," by John A. Volpe, pp. 4-14.
"Corporate Responsibility and Product Safety," by James S. Turner, pp. 15-29.
"The Impact of Consumerism on the Market," by Colston E. Warne, pp. 30-37.
"Consumer Protection. Information and Education: A Country's View," by John A. Occhiogrosso, pp. 38-46.
"Consumer Fraud and the San Diego District Attorney's Office," by M. James Lorenz, pp. 47-61.
"Current Efforts in Consumer Protection in the Business-Investment Area," by H. Warren Siegel, pp. 62-74.
"The Fault System, the Courts and the Consumer Revolt," by Joseph Kelner, pp. 75-81.
"Uniform Consumer Credit Code and National Consumer Act: Some Objective Comparisons," by Benny L. Kass, pp. 82-91.

Hubert H. Humphrey sets the keynote for the issue and states that "Quality is more than the merit of individual products, it is our total atmosphere." James S. Turner suggests a restructuring of priorities "to place consumers ahead of income." Colston E. Warne discusses the impact of independent product testing upon the market place. FTP

9.19 URANIUM LEVEL IN FOODSTUFFS

Rezanov, I. I.
Vop. Pitan. 28, 87-88 (March-April 1969) (In Russian)
Nuclear Science Abstracts 25, No. 5, 827 (March 15, 1971)

Fourteen classes of foodstuffs in Russia were investigated for their uranium level. Quantities of the order of 10^{-9} to 10^{-6}% were found. From animal products the highest concentration of uranium (4.3×10^{-7}%) was noted in goose eggs. (tr-auth.)
Reprinted

9.19 THEORETICAL EFFICIENCY IN POLLUTION CONTROL
(9.2)

Zerbe, Richard O. (University of Chicago)
Western Economic Journal 8, No. 4, 364-376 (December 1970)

This article deals with the efficiency of alternative arrangements for pollution control and their allocative effects. The author considers in a limited way the effects of different liability and procedural rules, and deals with the comparative effects upon the efficiency of resource allocation and the incentive to innovate of direct controls, subsidies, production and input taxes, and damage and emission taxes. The author states that the limited approach he used here illustrates the complexity of a fuller discussion.
[16 references]
FTP

9.3 THE OUTER CONTINENTAL SHELF -- MANAGING (OR MISMANAGING)
(9.4) ITS RESOURCES

Miron, George (Wyman, Bautzer, Finell, Rothman, and Kuchel, Washington, D.C.)
Journal of Maritime Law 2, No. 2, 267-288 (January 1971)

The author concludes that the resources of the Outer Continental Shelf of the United States must be managed so as to protect the environment. To help achieve this objective, the Department of the Interior must recognize the right of the public to participate meaningfully in proceedings to determine whether exploration permits should be issued and must obtain data on explored tracts before they are leased. [58 footnotes]
FTP

9.3 UNITED STATES OCEANS POLICY: AN ANALYSIS
(9.4)

Ratiner, Leigh S. (Office of the Secretary of Defense)
Journal of Maritime Law and Commerce 2, No. 2, 225-266 (January 1971)

The author analyzes a complex United States oceans policy decision (The President's Oceans policy statement of May 23, 1970) and the draft Convention that implements the policy decision [The United States introduced on August 3, 1970 at the United Nations Seabed Committee meeting in Geneva a "Draft United Nations Convention on the International Seabed Area."] The President's policy and the draft convention may satisfy no nation entirely, nor will they dissatisfy any nation entirely. The draft Convention, the author states, is a negotiating document; it balances a variety of interests and assures enough satisfaction for each of the interests to make continued negotiation on the basis of this document productive. The draft Convention "United States Convention on the International Seabed Area" is reprinted on pages 451-480 of the same issue of this Journal.
[71 footnotes]
FTP

9.3 MORE ABOUT OYSTERS THAN YOU WANTED TO KNOW
(9.4)

Power, Garrett (University of Maryland, School of Law)
Maryland Law Review 30, No. 3, 199-225 (Summer 1970)

The author examines the nature of the economic problems occasioned by treating oysters as common property and discusses the effectiveness of the response by Maryland State's legal institutions. He states that legally imposed cultural depriations preclude development of the full potential for producing oysters of the Maryland fishery. He suggests that fundamental to improved management of the oyster fishery is liberalization in the techniques through which individuals can obtain private rights in oyster beds. [154 footnotes]
FTP

9.19 CHROMATOGRAPHIC AND BIOLOGICAL ASPECTS OF ORGANOMERCURIALS

Fishbein, Lawrence (National Institute of Environmental Health Sciences, National Institutes of Health, Public Health Service and Department of Health, Education, and Welfare, Research Triangle Park, N.C. 27709)
Chromatographic Reviews 13, No. 2, 83-162 (November 1970)

This article is a review of the chromatographic and biochemical aspects of the organomercurials (principally agricultural and medicinal) with focus on methyl- and phenylmercurials and their ecological significance.
[56 figures, 45 tables, 183 references]
FTP

9.3 (9.4)

Because nation states of the world have been alerted to the vast seabed resources of the Continental Shelf and ocean floors, largely academic pronouncements on ownership of ocean space have been reexamined. In this article, the author examines significant seabed developments. He focuses primarily on the United States Draft Convention and subsequent British and French working papers and suggests that these three documents provide a substantial basis for international resolution of the seabed resource problem. [126 footnotes]

"International Control of Marine Pollution," by Norman A. Wulf (International Law Division, Office of the Judge Advocate General), pp. 93-100.

In this article, the author identifies some activities that pollute the marine environment. He concludes that the existing regime provides significant protection against oil pollution. However, he believes that further protection of the marine environment from oil and other forms of marine pollution is dependent upon the acquisition of knowledge about the effects of such pollution.
[52 footnotes]
FTP

9.19 CONTROLLING THE HUMAN ENVIRONMENT

Kode, Gerhard et al.
International Social Science Journal 22, No. 4, 561-725 (1970)

Seven of the eleven articles appearing in this issue are versions of papers originally submitted to the interdisciplinary symposium on "Man's Role in Changing the Environment: Architecture and Urbanism for Growth and Change" organized by UNESCO in collaboration with the Finnish National Commission for UNESCO and the Mannerheim League for Child Welfare, held at Otaniemi, near Helsinki, Finland from June 8-13, 1970. The issue contains the following articles:

"Introduction: The Economics of Pollution and the Interdisciplinary Approach to Environmental Planning," by Gerhard Kode, pp. 563-575.
"Utopia and Technology: Reflections on the Conquest of Nature," by William Leiss, pp. 576-588.
"Social Change and Environment," by Jiří Musil, pp. 589-606.
"The Impact of Technology on Culture and Emerging New Modes of Behaviour," by Talcott Parsons, pp. 607-627.
"Ecology and the Escalation of Human Impact," by Pierre Dansereau, pp. 628-647.
"Human Perception and the Environment," by Robert W. Kates, pp. 648-660.
"Approaches to the Measurement of the Environment," by Robert Reichardt, pp. 661-671.
"Towards a Planned Urban Environment," by William S. W. Lim, pp. 672-680.
"Architecture as a Bio-Science," by Balwant Singh Saini, pp. 681-690.
"Problems in Global Organization," by Chadwick F. Alger, pp. 691-709.
"The United Nations System and the Social Sciences," by Alexander Szalai, pp. 710-725. FTP

9.6 FISHERIES JOURNAL FOR HONG KONG

Anonymous
World Fishing 20, No. 1, 26 (January 1971)

Hong Kong has about 50,000 fishermen and over 6,200 fishing vessels, most of which are owner operated. A new journal, "Hong Kong Fisheries Bulletin," has just been started by the island's Agriculture and Fisheries Department to provide these fishermen with information about all aspects of the local industry. The first issue contains 100 pages covering such subjects as administration of the fishing industry, longline fisheries (with particular reference to the golden-thread long-lining), new species of local snapper, an assessment of active fishing vessels and fishermen, fish and fish products, production and trade statistics for 1968, and hydrography and weather of the Hong Kong fishing grounds. The journal is extensively illustrated. It will appear at irregular intervals. LB

9.2 YEARBOOK OF FISHERY STATISTICS.
(9.6) FISHERY COMMODITIES 1969

Food and Agriculture Organization of the United Nations 29, xix + 340 pp. (published 1970) (Fishery Statistics and Economic Data Branch, Fishery Economics and Institutions Division, Department of Fisheries, FAO, 00100 Rome, Italy)

This volume covers disposition of catches, and production and international trade data by types of fishery commodities. FTP

9.2 DWINDLING FISH SUPPLY CAUSES FROZEN PRODUCTION SLOWDOWN
(1.01)

Anonymous
Quick Frozen Foods 33, No. 9, 61-62 (April 1971)

Using figures published by the U.S. Department of the Interior, Office of Information, on the low supply of frozen fish available, a 5-year projection made by the U.K. Fisheries Laboratory at Lowestoft on depletion of cod supplies, and a report by the U.N. Food and Agriculture Organization on the ominous decline in the world catch of fish, the article paints a gloomy picture of the economic prospects of the fisherman, the industry, and the fish-consuming public. LB

FTP [11 footnotes]

In this article the author seeks to demonstrate that any sound and enduring development programs of the future will have to be carefully held within the limits imposed by considerations of biological productivity and natural resource conservation, limits which must be ascertained in advance for each site to be subjected to development processes.

9.2 INTERNATIONAL ECONOMIC DEVELOPMENT AND THE ENVIRONMENT
(9.19)

Nicholson, Max (Land Use Consultants, London, England)
Journal of International Affairs 24, No. 2, 272-278 (1970)

9.7 FIVE-COUNTRY NORTH SEA INFORMATION NETWORK

Anonymous
Fishing News No. 3006, 4 (January 29, 1971)

Britain, West Germany, Norway, Sweden, and the Netherlands have established an international network of moored meters in the North Sea. The object is to monitor currents, tides, fish movements, plankton, and pollution. The meters can measure the speed and direction of the tidal streams and the temperatures of the sea at intervals of 10 min. for up to 80 days. Since the whole area is covered, a very clear picture will be developed of how conditions in any one region compare with those in other regions and of such other things as the pattern of water movement by which fish eggs, small fish, and minute animals and plants that fish feed on are moved from place to place. Such a picture will alert fishermen to changing conditions that may affect fish congregations and give them more reliable information than is presently available about the strength of the tidal streams on fishing grounds, as well as providing fishery biologists with more accurate information about how fish populations are maintained from year to year.

The system units consist of current meters (up to three at different depths on a wire stretched between a subsurface float and a seabed anchor) and an accompanying surface marker buoy. Detailed information about the position of the meters is sent to all fishing-vessel owners by poster and daily radio message.
[3 figures] LB

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Coxworth, V. E.	16	7.8
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USE OF FUNDS FOR PRINTING THE ABSTRACTS WAS APPROVED
BY THE DIRECTOR OF THE BUREAU OF THE BUDGET APRIL 18, 1968.

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